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UNION OF SOUTH AFRICA.

DEPARTMENT OF AGRICULTURE

REPORT

WITH

APPENDICES

FOR THE PERIOD

1st JANUARY, 1912, TO 31st MARCH, 1913.

(EXCLUDING AGRICULTURAL EDUCATION).

Presented to both Houses of Parliament.

Price 9s. 6d.

CAPE TOWN:
CAPE TIMES LIMITED, GOVERNMENT PRINTERS.
1913.

[U.G. 47—'13.]

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DEPARTMENT OF AGRICULTURE.

REPORT FOR THE PERIOD 1ST JANUARY, 1912, TO
31ST MARCH, 1913.

(Excluding Agricultural Education).

CONTENTS.

	PAGE.
Report of Secretary for Agriculture...	1
Appendix	
I. Report of Principal Veterinary Surgeon...	41
II. " Chief, Division of Sheep	71
III. " Director of Veterinary Research	135
IV. " Superintendent of Dairying	143
V. " Manager, Government Cold Stores, Pietermaritzburg	153
VI. " Agrostologist and Botanist	157
VII. Report on "Rooibloem" Investigations	167
VIII. Report of Plant Pathologist and Mycologist	169
IX. " Chief, Division of Tobacco and Cotton	185
X. " Chief, Division of Horticulture	229
XI. " Viticulturist	253
XII. " Manager, Government Wine Farm, Groot Constantia	265
XIII. " Chief, Division of Entomology	271
XIV. " Chemist	297
XV. " Chief, Division of Publications	313
XVI. " Librarian	315
XVII. " Chief Inspector of Co-operative Societies	317
XVIII. " Registrar of Brands and Controller of Fencing	329
XIX. " Dry-Land Agronomist	335
XX. " Superintendent of Government Guano Islands	351
XXI. " Chief Inspector of Grain	359
XXII. Report on Ostrich Investigations	367
XXIII. " Weather Conditions	369
XXIV. Staff Statement	371
XXV. Statement of Imports	372
XXVI. Statement of Exports	373

1912/13 cont.

27 Dec. 1913 direct

INDEX

TO

REPORT OF SECRETARY FOR AGRICULTURE.

	PAGE
Adulteration of Wine, Spirits, etc.	31
Agriculture and Agricultural Education, Cost of	4
Agricultural conditions in Union	38
Agricultural Department: Organisation of, and Staff	1-4
Agricultural Journal	21
Agricultural Press	34
Agricultural Societies, Grants to	32-34
Animal Diseases	6-9
Botany	14
Brands and Fencing	23
Brandy, Adulteration of	31
Chemistry	19
Cold Stores	26
Conclusion	38
Conditions of Agriculture	38
Constantia, Government Wine Farm	18
Co-operation	22
Cost of Agriculture and Agricultural Education	4
Cotton and Tobacco	15
Crops	37
Dairying	13
Dry-land Farming	24
East Coast Fever	6-8
Entomology	18
Farm Foods and Fertilisers, etc.	32
Farm Labour	35
Fencing, Brands and	23
Grain Inspection	26
Grants in Aid: Agricultural Societies	32-34
Groot Constantia Wine Farm	18
Guano Islands	25
Horticulture	17
Introduction	1-6
Inspection of Grain	26
Labour, Farm	35
Legislation	34
Lichtenburg, Dry-land Station	24
Livestock	37
Mail Contract	39
Maize, Export of	26-27
Mycology and Plant Pathology	15
Ostriches	27
Plant Pathology and Mycology	15
Press, Agricultural	34
Publications	21
Scab	10
Sheep Division	9
Spirits, etc., Adulteration of	31
Statistics	27
Tobacco and Cotton	15
Transport, Communications and Markets	34
Veterinary Division	6
Veterinary Research	11
Vinegar, Adulteration of	31
Viticulture	17
Weather	36
Wool	10
Wine, Adulteration of	31

UNION OF SOUTH AFRICA.

ANNUAL REPORT of the Department of Agriculture for the Period 1912-13, with Appendices.

Presented to both Houses of Parliament by Command of His Excellency the
Governor-General.

PRETORIA.

The Hon. the Minister of Agriculture,
Pretoria.

I have the honour to present the following report on the working of the Department of Agriculture from the 1st January, 1912, to the 31st March, 1913.

It has been decided that in future Departmental reports are to be furnished for the financial year instead of for the calendar year, which accounts for the present report covering a period of 15 months instead of 12 months.

The financial year ends on the 31st March, and is more convenient both for accounting and agricultural purposes, than the calendar year; although as far as agriculture is concerned, the year ending 30th June would be still better, as the yields of the crops and the results of the experiments in Summer and Winter crops would all be available by then. However, it is impossible to fix a time to satisfy every requirement, and all things considered the financial year is probably the best that could be selected.

For the sake of convenience Vote 6, Agriculture, and Vote 7, Agricultural Education, are being administered separately; Mr. P. J. du Toit being Under Secretary for the former, and Mr. A. Holm, late Principal of the Potchefstroom Agricultural School and Experiment Station, for the latter.

The reports of the two votes will be published separately.

The appointment of an officer of the rank of Under Secretary to take charge of Agricultural Education will be a great relief, for under the conditions which obtained prior to the appointment it was impossible to do justice to either vote, and much of the work of Vote 7 was either hung up altogether or not attended to as it should have been. Substantial benefits have already been derived from the new arrangement; Vote 6 is being more adequately supervised, and Agricultural Education—a matter of the utmost importance to the country—is being co-ordinated throughout the Union, and placed on a proper basis.

The Public Service Commission foresaw the need for such an office, and recommended the appointment of two or three Under Secretaries to assist in the administration of the Department, but for various reasons, until recently, sanction could not be obtained for making the appointment.

With the appointment of an additional Under Secretary practically the whole of the recommendations of the Public Service Commission have now been given effect to.

Except as stated above no changes have been made in the organisation of the Department, and it and the policy pursued remain as described in my last report. The work of each Division is briefly reviewed in this report, and set forth in detail in the reports of the Chiefs of the Divisions, which are attached as appendices.

Exception was taken to the way the Department was organised, by certain Members of Parliament when the estimates were discussed, on the ground that it

was too split up. As a matter of fact there is no novelty in the planning of the Department, as the principle followed is the same as that adopted in practically all up-to-date Departments of Agriculture, and in the professions, and in commercial undertakings. The work of a Department of Agriculture is so extensive and so varied, and much of it is so highly scientific or technical in character that the only possible way of doing justice to it is by entrusting the various branches of it to men who by aptitude and training have become proficient in those branches, and to permit them to give their undivided attention to them. Further, the allocation of the work in the manner indicated makes for despatch, and what is also an immense advantage, ensures persons applying for advice receiving it at first hand from officers thoroughly competent to give it. Indeed the opportunity afforded of distributing the work to greater advantage and of making better provision for it in the way of staff and equipment coupled with the abolition of much duplication and overlapping, and the greater mobility of the staff, are by no means the least of the many benefits accruing from Union.

During the 15 months under review the principal changes in the staff of Vote 6 were as follows:—

Transfers: Mr. Henderson, Assistant Accountant, transferred as Accountant to the Irrigation Department. Mr. Pienaar, Registrar of Brands and Controller of Fencing to Defence; Mr. Taylor, Assistant Inspector of Co-operative Societies to the Land Bank.

Resignations: Mr. MacDermott, Chief of the Division of Publications, Mr. Chisholm, Manager of the Tzaneen Estate, and Mr. Goundry, Veterinary Surgeon. The last named, on account of ill health, from which I am sorry to say he died shortly after leaving the Service.

I have also to chronicle, with great regret, the untimely deaths of Mr. Steyn, Sheep and Wool Expert, and Mr. Goodwin, Officer in charge of the Botanical Experiment Station, Groenkloof; both of whom were officers of high character and marked ability.

Appointments: 6 Veterinary Surgeons, 2 Veterinary Bacteriologists, 1 Dairy Inspector, 3 Sheep and Wool Experts, and 1 professional Assistant to the Division of Plant Pathology. The staff of the last-named Division was further increased by the inclusion of the Curator of the Durban Herbarium, Dr. Medley Wood, and the Herbarium Assistant—Miss Franks.

At the present time the staff of Vote 6—as set forth in the appendix—consists of 160 Administrative and clerical officers; 115 professional and technical officers; 731 Field Officers, Inspectors and Guards; 25 Lay Assistants; 81 Miscellaneous officers and about 760 labourers.

The scientific and technical officers of the staff have been slightly increased in Vote 6, and considerably in Vote 7, and the clerical officers slightly, and the Inspectors and Guards considerably decreased. The reduction of the clerical staff is due to economies rendered possible by the consolidation of the four Departments, and the policy of entrusting as much of the work of the Department as possible, other than purely clerical, to professional and technical officers. Large as the staff is it will have to be considerably increased before it will be capable of meeting all the demands on it. The Secretary of the United States Department of Agriculture has frequently remarked upon the difficulty in obtaining suitable recruits for his Department, and of retaining the services of men of outstanding merit, because of the inducements offered to them by business enterprises; and the Development Commission in England also complain of not being able to obtain sufficient men competent to conduct research or to teach. The same problem, although in an accentuated form, is present here, and great trouble has been experienced in obtaining men possessing the requisite knowledge of their subject and the initiative to conduct research or ability to teach or administer. As one means of providing officers of the Department, a number of scholarships have been awarded annually during the last few years to promising young men to study agriculture, or the sciences bearing on it, abroad. About thirty scholarships for periods of from 3 to 4 years have been granted, and the first batch of scholars are due to return almost immediately. When they get back they will be taken into the Department on probation, and if they do well, will be given permanent posts.

Members of the staff of the Department have travelled extensively during the year, and with the exception of officers conducting research in the laboratories at head office, and the Chiefs and Assistant Chiefs of Divisions who have to direct operations generally and to deal with correspondence affecting their Divisions, practically the whole of the professional and technical officers of the Department

have been distributed throughout the Union. Representatives of the various Divisions have attended agricultural shows, conferences and other gatherings of farmers whenever possible in order to meet the farmers and act as judges, and to give advice, lectures and demonstrations. As a matter of fact the travelling expenses of the Department last year amounted to no less than £47,592.

With a view to serving the country better and getting the utmost out of the staff, several officers of the Department, who are continually travelling have been provided with motor cars or motor bicycles, and should the experiment prove successful the practice will be extended, as it is obvious that an officer with motor transport can cover far more ground than with a horse or mule transport.

In the course of the debate on the estimates the size of the clerical staff of the Department was adversely commented upon. Admittedly it is large, and every effort is being made to keep it within bounds, but in any case the clerical staff is bound to be extensive; the expenditure and income of the Department is something like £774,096 per annum, divided into an enormous number of items, and with many transfers from one to another, and on an average 450 letters and telegrams are received and 300 despatched per day (exclusive of circulars and permits), from head office alone. To conduct a business of such dimensions with only the head of it, or the Directors and the Auditors in the case of a Company, to be considered, would need a considerable staff, but in a Government Department, there are—in addition to the requirements of the Minister and the Cabinet—the demands of Parliament and the Auditor-General to be complied with, and the approval of the Public Service Commission and the Treasury to be obtained for appointments, promotions and retirements of the staff, and for increases in the expenditure on any particular item, and if any services are needed which fall within the Province of another Department, such as the erection of buildings or even the conduct of the smallest repairs to them involving the purchase of a little timber or a few bricks, or a little cement or paint, the Department responsible for the same has to be requested to undertake it, and it usually entails a considerable, and in some cases an inordinate, amount of correspondence. These formalities and safeguards may be necessary, but they render the carrying on of the work of the Department very tedious and expensive.

Attention has been directed to the equipment of the Divisions, and although some of them are not yet fully fitted up, all of them are better provided with books of reference, laboratory and other appliances, and lay and clerical assistants and other facilities for carrying on their work than they were.

By filling up gaps in the Transvaal Library—which had attained respectable dimensions before Union—with books from the Departmental libraries at Cape Town and Maritzburg, and by purchases and exchanges, a collection of agricultural literature has been got together which, though it still needs augmenting, is far in advance of anything previously existing in South Africa, and is of the greatest use to the Department.

Complaints have been made of over-centralization of administration, and of undue concentration of officers in Pretoria, and it has been suggested that sub-departments should be established in the Provinces, or that representatives of the Department, “with power to act,” should be stationed in each Province. The charge of excessive concentration of staff in Pretoria is not justified as in proportion to the staff of the Department there are fewer officers in the Department in Pretoria than there were in the Head Offices of the Colonial Departments before Union, whilst on the other hand, after excluding the officers at the Agricultural Schools and Experiment Stations, whose numbers have been considerably increased since Union, there are more officers distributed throughout the Union than ever before. Probably the reason for the impression that has got about that officers are unduly concentrated in Pretoria, and that less work is being done in the country than formerly, is due to the fact that previous to Union the officers of the various Departments were congregated chiefly at the Capitals of the various Colonies, and, therefore, more apparent to persons visiting them, whilst now—with the exception of those stationed at Pretoria—they are distributed uniformly throughout the Union, and therefore are not so conspicuous as they were.

The complaints about centralisation are also understandable, but although means may be found of meeting them to a certain extent, it will be impossible to satisfy them altogether, as in the main the trouble complained of is one of the unavoidable results of Union. There are many matters which must be submitted to the Minister for authority or ruling or to other Departments such as Finance or the Public Service Commission, or that have to be directed from one centre in order to ensure uniformity of administration, which can only be dealt with at the

seat of Government. Before Union there were four Governments and Four Ministers of Agriculture, and naturally it was easier for the public to interview or communicate with a Minister or his Department and to obtain authority or information which can only be granted or imparted by the Minister himself, or after consultation with him, than it is at present with one Minister and one Government for the whole country.

The establishment of sub-departments would not remove the difficulty complained of, as the Minister could not delegate to the Head of it greater power than is now given to officers in the Provinces, and on the other hand they would be very expensive and cumbersome to work. The proposal to give certain officials in the Provinces "power to act" is equally impracticable. The only alternative to the present arrangement would be to transfer the branches of work which it is thought are unduly centralised to the Provincial Councils or other local authorities, should such be formed, and it is quite possible that in the course of time it may be advisable to move in that direction, but the matter is one upon which there is much to be said from many points of view, and any hasty or ill-considered action in respect thereto is to be deprecated.

The Department is still greatly handicapped by the manner in which it is housed. At present it occupies the whole or portion of no less than 9 Buildings, situated in various parts of the town; several of them being quite unsuitable for the purpose for which they are used. A Building for the Department is badly needed, and it is hoped will be provided without delay. An admirable site for such Building with a space for the necessary outbuildings, such as green houses, insectaries, and for out-door experiments on a limited scale, has been reserved on the grounds adjoining the Union Buildings. As a beginning of the concentration of the Department the Division of Plant Pathology has recently been transferred from the cramped and inconvenient quarters it formerly occupied to a commodious dwelling house on the site in question. The house is well adapted for the use of the Division, and is so situated that it will not interfere with the larger building or with the laying out of the grounds.

During the period under review the following buildings were erected, exclusive of those referred to in the report on Agricultural Education: two dwelling houses at the Veterinary Research Station, Onderstepoort; a wool and sheep shearing shed at Ermelo Experiment Farm; a dwelling house and Tobacco Curing barn, Piet Retief Tobacco Experiment Station, and a dwelling house and barn, Rustenburg Tobacco Station, plans were prepared for an Oenological Institute at Elsenburg, and for extensive additions and alterations to the Veterinary Research Station, Onderstepoort.

The expenditure on Agriculture and Agricultural Education for the last two years was as follows:—

	1912-13.	1911-12.
Vote 6, Agriculture	£468,700	564,578
Vote 7, Agricultural Education	126,667	89,246
Loans to farmers	83,520	77,014
	<hr/> £678,887	<hr/> 730,838

A statement of the expenditure and revenue of the various sub-divisions of Vote 6 for the last two years, together with brief explanations of the same is given below, fuller details of the receipts and expenditure of the Department will be found in the report of the Controller and Auditor-General.

The loans to farmers were for the erection of fences and dipping tanks.

A considerable proportion of the reduction of the expenditure on the Agricultural Vote and of the increase on the Vote for Agricultural Education consists of transfers from one to the other. From the statement of accounts of the Divisions and the reports it will be seen that the chief expenditure of the Department has been in protecting the live stock and crops of the country from disease—the first and most important of the duties of a Department of Agriculture—and upon agricultural education and research.

VOTE 6, AGRICULTURE.

				Year ended 31st March, 1912.		Year ended 31st March, 1913.	
				Expenditure.	Revenue.	Expenditure.	Revenue.
				£	£	£	£
(a)	Administration	...	...	34,869	...	30,404	...
(b)	Grants-in-aid	...	...	19,680	...	31,213	...
(c)	Veterinary	...	...	249,276	7,968	113,183	4,442
(d)	Sheep	...	...		6,154	104,934	...
(e)	Bacteriology	...	...	55,450	6,932	54,331	7,225
(f)	Dairy Industry	...	...	4,817	...	4,535	...
(g)	Botany and Agronomy	...	...	18,097	...	3,597	...
(h)	Plant Pathology & Mycology	...	...		...	2,825	...
(i)	Tobacco and Cotton	...	...	11,008	694	11,184	1,292
(j)	Horticulture	...	...	4,325	403	4,124	265
(k)	Viticulture	...	...	7,756	277	4,037	2,138
(l)	Entomology	...	...	14,320	*	11,769	5,024
(m)	Chemistry	...	...	6,684	...	1,138	...
(n)	Publications	...	...	4,316	...	5,280	...
(o)	Co-operation	...	...	5,288	...	4,936	...
(p)	Brands and Fencing	...	...	39,489	12,136	11,246	10,792
(q)	Dry Land Farming	...	...	4,767	...	3,848	...
(r)	Guano Islands	...	...	26,773	42,140	25,508	35,343
(s)	Cold Stores	...	...	7,921	13,986	4,557	2,257
(t)	Field Cornets	...	...	24,515	...	24,444	...
(u)	Grain Inspection	...	...	4,057	2,216	3,516	1,919
(v)	Ostrich Industry	...	...	3,886	...	5,384	...
(w)	Transport (Natal)	...	...	10,302	...	...	...
(x)	Steam Ploughs (Natal)	...	...	7,982	5,190	2,707	3,583
	Miscellaneous...	...	...	...	11,808	...	21,399
				£564,578	115,904	468,700	95,679

* Included in Miscellaneous.

The reduction in the cost of administration was due to the reduction of the clerical staff.

The increase in grants to agricultural Societies was due to an increase in the number of the Societies, and to the activity of the Societies generally in improving their show yards. The grants were on the same basis as in former years. In 1911-12 the expenditure on scab and sheep was included in the Veterinary estimates, so for the purpose of comparison, items (c) and (d) should be taken together.

Until last year Plant Pathology and Mycology formed a branch of the Division of Botany. The reduction in the aggregate expenditure of the two Divisions was due to the transfer of the Agriculturist and Agricultural Assistants and the Malmesbury Experiment Farm in the Cape Province, and the Agronomist in the Orange Free State to Vote 7 Agricultural Education. The officers in question—although not botanists in the strict sense of the word, were provided for under the heading of Botany in the Estimates after Union, pending the reorganisation of the Department. The Field Experiments in the Transvaal were handed over to Potchefstroom, and the control of noxious weeds throughout the Union to the Provincial Councils, in accordance with the Financial Relations Act.

The expenses in connection with the care and disposal of the brandy taken over from the Agricultural Distillers Associations were borne in 1912-13 by the Department of Finance.

The saving on Entomology was due to the absence of locusts, and the reduction of expenditure on pernicious scale. The saving on Chemistry is accounted for by the transfer of the Chemical Laboratories at Cape Town and Grahamstown, which were chiefly occupied with work in connection with Public Health, Justice and Customs, to the Department of the Interior.

The reduction on Brands and Fencing was due to the discontinuance of the supply of fencing material in the Transvaal.

The East Coast Fever transport in Natal was sold. What was known as the Natal transport was transferred to Defence. The Steam ploughs in Natal have also been discontinued.

Attention was drawn by the Public Accounts Committee to the expenditure on travelling. The sum £47,592, is certainly a very large one, but it cannot be reduced without curtailing the work of the Department, for as already stated the greater proportion of the officers of the Department move about the country a good deal, and a large proportion of them, like Veterinary Surgeons, Stock Inspectors, Sheep and Wool Experts, Sheep Inspectors and other Inspectors and Instructors are constantly travelling, and would be of little use unless they were.

The straightening out of the accounts of the 4 Departments, and the inauguration of a system of accounts for the Union Department has been a trying job, as each Department had a different system of accounting, and there were many transactions more in the nature of side lines than the legitimate work of an Agricultural Department, to be dealt with. Nearly all the arrears have now been wiped off; some transactions and undertakings which were not justified have been discontinued, and other branches of work have been transferred to Departments more directly concerned with them. The operations of the Department are thus gradually being limited to its proper sphere, and although the accounting for a vote like Agriculture will never be an easy matter, it will at all events be simpler than before.

The recovery of the instalments due on account of sales of live stock and material, services rendered and loans made to farmers by the Governments of the various Colonies before Union—such as advances to co-operative dairies, dip depôts, arsenite of soda in the Cape Province, East Coast Fever Fencing in the Transvaal. Steam Ploughing, Transport, Fencing, and the loan and sale of sheep, donkeys and mules in Natal, and loans to Dairies in the Orange Free State, and the granting of loans for fencing and dipping tanks since Union—have imposed an immense amount of work on the accounting staff, but it is now rapidly being overtaken.

The Dip Depôts in the Cape Province have been straightened out, the steam ploughs in Natal have been disposed of, with the exception of two sets, for which offers are now being considered; a portion of the transport has been sold, and the remainder transferred to Defence; the sheep which were leased to farmers in the Northern parts of Natal have been sold as the leases expired; the Cold Stores at Maritzburg, which did very little business, have been closed down after an unsuccessful attempt to lease them as a going concern, and provision is being made for the discontinuance of the stores at Vryburg. The destruction of vermin and the eradication of noxious weeds have been transferred to the Provinces in accordance with the terms of the Financial Relations Act.

The adjustment of the grants in aid of Agricultural Societies occupied a great deal of time, as before Union each Colony supported Agricultural Societies in a different way, and owing to the shortness of money immediately before Union, some of them had not fully discharged their obligations to the Societies at the date of Union, consequently there were arrears to be considered, and many readjustments to be made in order to place Societies throughout the Union on an equal footing. Further, the accounts of many of the smaller Societies were not well kept, and a good deal of trouble was experienced in obtaining the information and vouchers which were required before the grants could be paid. Under the Financial Relations Act the Provinces can take over grants in aid of agricultural societies if they think fit, and the Cape Province has elected to do so, and the others will probably follow suit before long.

On the representations of this Department, provisions were made in the Land Bank Act, and in the Fencing and Dipping Tanks Acts for the granting of loans to co-operative Societies and to farmers for the erection of fencing and dipping tanks required by law, by the Land Bank, and it is hoped that in future all advances to farmers will be made by it, as it is obviously advisable that all loans to farmers should be on a business footing, and be made by an Institution like the Bank rather than by this or any other Department.

VETERINARY DIVISION.

As in past years East Coast Fever has occupied the lion's share of the attention of the Division. On the whole the position has considerably improved during the year, although there have been extensions in the Transkei and in the neighbourhood of the previously-infected areas, practically no fresh ground has been broken since the outbreaks in the South East of the Cape Province early in 1912, and in the case

of these outbreaks the spread of the disease has been restricted. The extension of dipping and fencing, and the providing of more food on the farms for the live stock, and so reducing the necessity for trekking, have done much to bring about a better condition of affairs. The difficulty of enforcing dipping in Native Locations and on unoccupied or leased farms has hitherto been a great obstacle to progress, but thanks to the Native Affairs Department, who are now busy erecting tanks in the locations, and arranging for their supervision, and the powers conferred by the Dipping Tank Amendment Act, it is being overcome.

In the Transvaal there has been a marked improvement, and there is reason for hoping that if the present rate of progress is maintained the Province will soon be entirely free from the disease.

During the last 15 months there were 15 outbreaks of the disease, 12 of which were in the District of Piet Retief, and on the 31st March there were 54 farms in quarantine as against 183 on the 1st January, 1912. There are now approximately 335 dipping tanks in the Transvaal, and 36 in the course of erection.

In Natal the disease has lost many of its terrors, owing to the protection afforded by dipping and fencing, and the position is much better than it was, but although the number of centres of infection has diminished the disease is still widely distributed throughout the Province, and much will have to be done before it will be completely eradicated.

The Department has been severely criticised and reproached by a section of the public in Natal for imposing unreasonable restrictions upon the movement of stock in infected and suspected areas, and for refusing to allow cattle to be removed from Natal to other parts of the Union, and a vigorous agitation has been conducted in favour of more liberty of movement of stock in Natal, and the admission of pure bred and slaughter stock from Natal to the other Provinces. It is sincerely hoped that the regulations dealing with the restriction of movements of cattle in infected and suspected areas will not only be tolerated, but supported. It is true the farmer who dips his cattle properly has little to fear from the disease, and if there was no hope of stamping out the disease in Natal, and the whole of the Union were infected, the regulations might be relaxed, but there is every reason for believing the disease can be exterminated in Natal, moreover, many parts of Natal, and by far the greater portion of the Union are free from the disease, and I am of opinion that under the circumstances any weakening in the campaign against the disease in Natal would be contrary to the best interests of the farmers. The admission of cattle from clean areas in Natal to the other Provinces is more open to argument. Theoretically there should be little or no danger, but in practice it would be impossible to eliminate all risk of infection by accident or otherwise, and as there is a strong feeling in the other Provinces against the admission of such cattle, it was thought better not to make any alteration at present. During the fifteen months there were 213 outbreaks of East Coast Fever in Natal; at the commencement of that period there were 818 farms in quarantine, and at the end 581. Many of the latter are old infected areas, some of which may have become clean, but which are still regarded as suspect. 1,456 dipping tanks were erected during the year, and at the present time there are approximately 1,795 tanks in existence, and 250 under course of construction.

In the portion of the Transkei occupied by Europeans where the farms are fenced and dipping is becoming common, East Coast Fever is being held in check, but in the Native areas—which for the most part are unfenced, and are one continuous grazing ground, the disease is still rife.

As mentioned in my last report the Transkei has been constituted a veterinary area, with a Senior Veterinary Surgeon in charge, who is allowed a wide discretion in dealing with matters of local interest. In order to save as many cattle as possible the method of inoculation discovered by Dr. Theiler was largely resorted to, and some 158,000 cattle were operated upon. The method is not an ideal one, as the mortality for the operation is considerable, and there is the risk of the disease being perpetuated by calves born of uninoculated animals before the veld has become clean, but under the circumstances inoculation was justified, and a large number of animals have been saved for milk, for ploughing, and for transport, without which the situation would have become still more serious. The Chief Magistrate and the Native Council are co-operating with the Department, and making strenuous efforts to check the disease by restriction of movements of cattle and dipping, and the erection of tanks is now proceeding apace. On the 31st December, 1911, there were 210 tanks, and on the 1st January, 1912, there were 356 tanks

erected or under construction in the Transkei, and there is reason to believe the tide is turning, and that from now onwards an improvement will be manifest.

The outbreaks of East Coast Fever in the neighbourhood of East London and Kingwilliam's Town have caused great anxiety. The areas in question are chiefly occupied by small European farmers, many of whom are tenants, and by a dense native population, and under such circumstances the disease is very difficult to deal with; fortunately it has been prevented from spreading to any extent, and although we are by no means out of the wood, the outlook is brighter than it was.

Tuberculosis.

The position as regards Tuberculosis amongst cattle is unsatisfactory. It is generally agreed that Tuberculosis is communicable from cattle to human beings, and the disease is also the cause of loss to farmers, though not to the same extent as many other contagious diseases.

Owing more particularly to its relation to public health, there is a strong feeling amongst the public in almost all countries that something should be done to control the disease, but the subject bristles with difficulties—and up to the present no country has evolved a wholly satisfactory scheme for dealing with the disease. In many countries practically nothing is done to control the disease; in others, assistance is given to farmers for the testing of cattle and so forth, but there is no compulsory testing or slaughter of all infected animals. In England it was recently decided to slaughter animals that have become emaciated or have diseased udders.

The chief reasons for the hesitancy in dealing with the disease are the large number of cattle infected with it, particularly in the older countries, and the fact that in many cases animals infected with the disease suffer little, if any, ill effects from it, and remain to all intents and purposes perfectly healthy until the end of their lives. Further, as the history of the disease on the Potchefstroom and other of our Experiment Farms, Shows, the eradication of it is apt to be a very tedious and expensive business, and the avoidance of re-infection costly and difficult. There is also a feeling that there is yet a good deal to be learned about the disease, particularly in regard to the manner in which animals acquire it, and the diagnosing of it. The course that is being followed by the Department at present is to test all cattle entering the Union from overseas, and to destroy such as react without compensation. Cattle are not allowed to be removed from the quarantined area in the Cape Peninsula and neighbourhood, where tuberculosis is supposed to be particularly prevalent, to other parts of the Union without first passing the Tuberculin test. If the Division is notified of the existence or suspicion of Tuberculosis in a dairy herd the suspected animals are tested, and if other cases of Tuberculosis are found the in-contacts are also tested. Animals that react are slaughtered if badly infected, and compensation is paid to the extent of a quarter of the value of the animal, the value not to exceed £60. Under certain conditions breeding animals are allowed to be isolated, in order that they may be bred from.

Several of the large Municipalities are taking steps to prevent milk from tuberculous cows being sold within their areas.

The objection to these measures is that they go too far or not far enough, and it is argued that it is not fair to single out particular herds for testing, and that either all cattle should be tested or that no cattle should be tested, except at the owner's request.

It is also urged that the compensation is inadequate, and that the amount should be increased, and that cattle destined for South Africa should be officially tested in the country of origin before shipment.

Without testing cattle on an extensive scale it would be impossible to estimate the number of cattle infected with Tuberculosis, but judging from the tests conducted by the Veterinary Division the proportion is not great, though the infected animals would be more valuable than the average, inasmuch as they would consist mostly of imported cattle or their descendants.

It will thus be seen the position in the Union is different from that in most other countries, and in the opinion of the Principal Veterinary Surgeon "there is yet time to tackle the disease with some hope of getting the better of it at an outlay which is not prohibitive." In any case the matter is one deserving the fullest consideration, for if the country could be freed of the disease it would be a great

blessing, while, on the other hand, it would be worse than useless to embark upon a campaign against Tuberculosis without a reasonable assurance of being able to complete it.

It is understood the English Board of Agriculture is proceeding with the establishment of a quarantine station for testing cattle in England before shipment, and the Netherlands Government is also testing cattle officially, but it is questionable whether it would be wise to forego the test on this side until experience has been obtained of the working of the new arrangement.

Pending a decision on the whole subject, which for many reasons will probably take a considerable time to arrive at, I think the compensation for slaughtered animals on account of Tuberculosis, should be substantially increased.

The animals are killed mainly to protect the health of the public, therefore it seems only reasonable that the public should bear their share of the burden, for in addition to the value of the animal, the farmer suffers serious loss in other ways by the slaughter of his stock.

Every facility should be afforded by the State for the testing of cattle, and the liberty now afforded to farmers of isolating cattle, subject to the approval of the Principal Veterinary Surgeon, should be maintained.

The systematic testing of all dairy cattle in Municipal areas, or from which milk is obtained for sale to the public, is by far the most difficult point to settle. It is, undoubtedly, very desirable to give effect to it, but it would, as the Principal Veterinary Surgeon points out, necessitate a large increase in the number of Veterinary Surgeons, as it would be impossible to carry it out with our present staff.

Anthrax.

The Principal Veterinary Surgeon states there is good reason for believing this disease is becoming more prevalent, which he attributes to the carelessness displayed by farmers in reporting cases of Anthrax or suspected Anthrax, and in disposing of carcasses of animals that have died of the disease. Fortunately animals can be cheaply and effectually protected from the disease by inoculation.

Other Diseases.

A steady improvement has been manifest in Glanders, Lung sickness, Epizootic Lymphangitis, Mange, and Swine Fever. A few years ago these diseases were prevalent, but they have now been reduced to very small proportions.

Rinderpest.

Early in 1912 there were disquieting rumours of the Southward spread of Rinderpest in German East Africa. In order to ascertain the exact condition of affairs the British South African Company despatched their Assistant Principal Veterinary Surgeon to German East Africa, and on the initiative of His Excellency the High Commissioner, a conference of the Principal Veterinary Surgeons of the Union, The British Protectorate, Rhodesia, Portuguese East Africa, and the Belgian Congo, was held in the following April, to consider the situation; the recommendations made by the Conference are embodied in the Principal Veterinary Surgeon's report. Fortunately the disease has not extended beyond the German border.

A sign of the times, which is welcome, is the demand which is arising amongst the farmers for the services of Veterinary Surgeons, and it is hoped that something may be done to encourage private Veterinary Surgeons to settle in country Districts in the same way as is done with District Surgeons.

SHEEP DIVISION.

The organization of the Division and the method and progress of its work are clearly described in the report of the Chief of the Division.

The Staff is gradually being fixed up, but it has been a troublesome and tedious business, owing to its size and the difficulty of obtaining competent and otherwise suitable men as Sheep and Wool experts and Sheep Inspectors.

The sheep inspectors have been placed on an incremental scale of salary, and where not over age, are allowed to contribute to the Pension Fund. These posts were formerly non-pensionable, and the change in the status of the officer and the prospect of a pension will be an inducement to good men to enter and remain in the Service.

During the period under review 27 sheep inspectors retired voluntarily, 4 were retired on account of age, 10 were dismissed, and 103 were appointed,

[U.G. 47—'13.]

At the present time the staff of the Division, excluding head office staff and temporary assistants for simultaneous dipping and wool sorting is as follows:—

Cape Province:	15 Senior Sheep Inspectors.
	225 Sheep Inspectors.
	3 Sheep and Wool Experts.
Transvaal:	3 Senior Sheep Inspectors.
	87 Sheep Inspectors and Field Cornets.
	3 Sheep and Wool Experts.
O.F.S.:	3 Senior Sheep Inspectors.
	2 Sheep and Wool Experts.
	57 Sheep Inspectors.
Natal:	2 Senior Sheep Inspectors.
	27 Sheep Inspectors.
	1 Sheep and Wool Expert.

The number of Sheep and Wool Experts is insufficient to meet requirements, and provision has been made on the Estimates for 3 additional officers, and the areas of many of the Sheep Inspectors are too large for them to do justice to, and their number should also be increased.

Many of the Senior Inspectors are now getting motor cars instead of horse transport, and it is hoped that the change will add to their efficiency.

The Field Cornets in the Transvaal continue to act as Scab inspectors, but it is desirable for many reasons that the two offices should be separated.

Besides enormously increasing the trouble of dealing with scab, the drought inflicted severe losses on sheep farmers, and it is estimated that in addition to the general loss in condition some 2,000,000 sheep and goats perished.

A great deal of attention has been given to the scab regulations. The conditions under which sheep are kept, and the system of farming vary greatly in different parts of the Union, and it has been no light task to formulate regulations to meet all circumstances, and at the same time to ensure some measure of uniformity. It was also impossible to foresee and provide for all contingencies, and in some cases only actual experience could disclose what was or was not desirable and feasible.

On the whole the regulations have proved satisfactory, though it is quite possible that a more extended experience of them will reveal the necessity for still further amendments in certain directions.

Under a Minister's Order published in 1911 all owners of sheep are compelled to erect tanks, and during the past twelve months 4,553 sheep dipping tanks were erected.

In order to overcome the prejudice and ignorance which exist in respect to dipping in many quarters Inspectors have been instructed whenever opportunity offers to show backward farmers how to perform that operation, and last year no less than 3,708,237 sheep were dipped under the supervision of the Inspectors.

In consequence of the protest made by the Bradford Chamber of Commerce against the use of lime and sulphur and caustic soda and lime dips on account of the damage caused by them to the wool, inquiries are being made to ascertain exactly what effect, if any, these dips have upon wool. There is no doubt that the dips in question are efficacious, safe to use and cheap, and it is questionable whether if they are properly prepared and the sheep are dipped at the proper time they cause any damage to the wool.

Investigations into the scab parasite and dips that are likely to have an important bearing on scab eradication, are being conducted by Mr. Shilston at the Veterinary Research Laboratory, Pietermaritzburg.

By far the hardest task of the Division has been the prevention of movements of infected sheep and goats, and the subject is discussed at length in Mr. Enslin's Report.

It has been suggested that no sheep should be allowed to be moved without being certified by an Inspector to be free from scab, but as Mr. Enslin points out there are grave objections to that course, and the onus of knowing whether or not scab is present, and of reporting it, must rest with the owner of the sheep.

During the six months ending 31st December, 1912, 1,969 persons were convicted of contravening the Scab Regulations, and fines amounting to £5,570 were imposed.

The Division was only formed at the passing of the Diseases of Stock Act in 1911, and its operations were greatly handicapped by the severe drought, so it is too

early to furnish any very striking results, but as far as can be ascertained from the records of the sheep examined at Johannesburg market, which is by far the largest in South Africa, and from such other data as are available, an improvement has already been made, and there is good reason for believing that if the policy now adopted is continued, and the division is supported and strengthened substantial progress will be made in the next few years.

The educative and police work of the Division are being supplemented by other forces, which cannot fail to greatly assist it in controlling scab. The number of woolled sheep in the Union are increasing, and of non-woolled sheep decreasing, and it is the latter which constitute a great obstacle in dealing with scab, as the disease is harder to detect in them, and does not cause nearly as much loss to them as to woolled sheep, and consequently there is not the same incentive to keep them clean. Further the quality of woolled sheep is improving, and farmers are taking more interest in their sheep and wool.

Fencing is becoming more general, both vermin proof and other, and the practice of allowing sheep to run by night as well as by day instead of kraaling them is growing; even in the North West of Cape Province there is a better feeling, and the Native Council of the Transkei has of its own initiative offered to co-operate with the Department in dealing with scab in the Native Territories, and to erect tanks and supervise dipping.

Good work has been done by the Sheep and Wool Experts, whose duty it is to travel about the country and advise the farmers by lectures and demonstrations how to select and manage sheep, and how to prepare wool for market; the services of these officers have been in great request, and provision is being made for increasing their number by the addition of two students now being trained for this purpose in Australia, and one other officer, an Angora Expert, should also be appointed to the Division, and stationed at Grootfontein, or some other convenient centre.

In the course of the year Mr. MacNab visited Australia, on leave, in the course of his visit he purchased over 900 Wanganella and Tasmanian Ewes and Rams for our Agricultural Schools and Stud Farms, and for farmers.

Mr. Mallinson and Mr. McKee visited England on leave, and whilst there inquired into the marketing of wool in Europe, and the vexed question of the effects of dips on wool.

Within the last few years a great improvement has been made in Merino Sheep; the flocks are becoming more uniform and true to type, the quality of the best sheep is being raised, and good stud and flock rams are becoming more plentiful.

It will be great help to farmers to be able to purchase home bred rams at reasonable prices instead of having to import rams at a considerable risk and expense, or to buy them from importers, the money paid for them will be kept in the country, and what is more important there will be a prospect of a type or types of sheep being evolved which will be still better adapted to the country than the sheep from Australia or elsewhere.

According to the returns furnished by the Sheep Division there are 27,331,167 woolled sheep and 8,557,754 other sheep, 4,395,101 Angora goats and 7,296,061 other goats in the country and despite the ravages of the drought the merino sheep increased by 5,489,855, and Angora goats by 119,766 in the last 18 months, whilst Africander and Bastard sheep decreased by 253,330, and other goats by 10,958 in the same period.

The prices at the Coast of well-conditioned graze veld clips varied from 8d. to 11d. per lb. in the grease, a few exceptional clips realized a little more, and poor clips a little less. Good mohair averaged from 10d. to 1s. per lb.

DIVISION OF VETERINARY RESEARCH.

The Director, Dr. A. Theiler, C.M.G., proceeded on one year's leave to Europe in September, it being essential that he should have a prolonged rest from the arduous duties of his office. He is devoting his leave to studying the latest advances in Veterinary, Bacteriology and Pathology. During his absence Mr. W. Robertson, M.R.C.V.S., Assistant Director, has been in charge of the Division.

In order to provide for the rapidly increasing work of the Laboratory extensive alterations and additions are being made at Onderstepoort, and a residence is being erected for the Assistant Director.

The Laboratories at Pietermaritzburg and Grahamstown have been maintained as in previous years.

Investigations into Lamziekte have been continued, and have occupied the foremost place in the work of the Division. The cause of the disease has not yet been

discovered, but to quote from an article which the Acting Director prepared for the Journal, Dr. Theiler believes Lamziekte to be "a disease principally of the muscular system caused by toxin or poison which collects there, and is obtained by the animals from certain plants which have their poisonous properties formed in them at certain seasons, or as the result of certain conditions of weather or veld." At present no preventative or cure is known, but Dr. Theiler inclines to the belief that a preventative will be found in bettering the conditions of food supply, by providing artificial food, such as ensilage, and by breaking up the veld and cultivation and change in the pasture rather than by any form of inoculation or dosing with drugs.

In order to test Dr. Theiler's theory that the disease is caused by the continued ingestion of injurious vegetable substances, extensive and detailed experiments have been conducted in conjunction with the Botanist at the following centres, "Armoedsvlakte," Vryburg, "Manley Flats," and "Sevenfountains," Lower Albany, Cape Province, "Kaffraria," Christiana, Transvaal, and "Bestersput," Orange Free State.

The farms which are all notorious for the disease have been divided into a number of paddocks, and stocked with cattle, with a view to ascertaining whether the disease is confined to any particular portion of the farms. Cattle are also being tethered and fed entirely on certain plants regarded as suspicious by the Botanist, and the same plants are also being planted out in acre plots for the purpose of feeding cattle on them exclusively. Experiments in the feeding of hay from infected areas are being conducted at the Laboratories at Onderstepoort and Grahamstown. Unfortunately, the experiments were seriously affected by the drought, and in many cases they will have to be repeated next year.

The investigations into the disease have been greatly hampered by the difficulty of obtaining cases, for so far, with the exception of two suspicious cases amongst stabled animals at Bestersput, all attempts to transmit the disease from one animal to another, or to produce it by feeding have failed, and the Division has been entirely dependent upon veld infection for material to work with.

Owing to its resemblance to certain diseases of human beings Mr. Stead, Assistant Chemist and Bacteriologist in the Public Health Laboratories, has suggested that the disease may be due to the lack of certain vital principles in the herbage, and arrangements are being made for him to test his theory.

Amongst other investigations conducted during the year were:—experiments with a new tick (*Ornithodoros-Magnini*) discovered by Dr. Theiler in the Vryburg District; the investigation by Mr. Shilston of the Pietermaritzburg Laboratory of an outbreak of Trypanosomiasis in Zululand, and by Mr. W. H. Andrews, of a strain of Trypanosomiasis sent from Portuguese East Africa. In investigating disease of ostrich chicks a new parasite was found by Mr. Walker, of the Grahamstown Laboratory, and, as a result of experiments with the plant *Cotyledon orbiculata*, it was proved to be poisonous to fowls. Further investigations with a view to isolating the toxic principle will be made.

At the Pietermaritzburg Laboratory investigations were continued into the effect of snake bite on domesticated animals, and in June the immunisation of horses against snake bite, for the purpose of producing antivenene for the treatment of human beings, was re-commenced; several reports of successful treatment have been received.

Mr. Shilston has also conducted some important enquiries into Scab in sheep and goats, and the effect of dips on the pest, and on the sheep and wool.

As usual the Division has performed an immense amount of routine work in diagnosing diseases, and preparing vaccines and sera. During the year 1912, 6,280 specimens and smears were received at Onderstepoort for examination, as against 5,453 in 1911; from January to March, 1913, 2,176 were received. At Pietermaritzburg 2,659 examinations were made, and at Grahamstown 667 as against 375 in the previous year. 1,884 mules were inoculated against Horsesickness, with a mortality as a result of the inoculation of 3.1 per cent.; while of 606 horses inoculated 11.5 per cent. succumbed. The inoculation of horses is, as yet, experimental, the immunity imparted having been not yet fully ascertained.

The issue of vaccines, etc., from the Laboratories was as follows:—

Blackwater Vaccine	311,170 doses.
Blue Tongue Vaccine	657,948 „
Vaccine Lymph	725,686 „
Redwater and Gallsickness	9,790 „
Redwater (privately owned cattle inoculated at Grahamstown)	739 „
Mallein	18,065 doses.

159,000 cattle were inoculated in the Transkeian Territories against East Coast Fever by the process discovered in the Division's Laboratory.

87,475 and 12,558 doses of Anthrax Vaccine and Tuberculin respectively, which are obtained from Europe for sale at cost price, were issued.

During the course of the year the re-organization of the staff of the Division was carried into effect. It is evident, however, that the professional staff is insufficient to cope with the work, and Dr. Theiler has been requested to secure the services of a Pathologist of European repute to visit South Africa in connection with Gal Lamziekte investigation, as well as to engage a Physiological Chemist and an additional Veterinary Bacteriologist.

In addition to the research conducted in South Africa, investigations are being pursued by Professor Nuttall, F.R.S., at Cambridge, England, into East Coast Fever, for which a grant of £500 was made to him by the Government in the year 1910-11. A preliminary report has been made by this gentleman, but as the experiments are still in progress, nothing can yet be made public.

For some years past a veterinary clinique had been conducted at Grahams-town Laboratory, at which animals belonging to residents in the neighbourhood were treated for various ailments not coming under the classifications of scheduled contagious diseases, but as the amount of research work and the demand for vaccines has increased so considerably of late instructions were given for its discontinuance shortly after the close of the period under review.

The staff comprised on the 31st March last: The Director and Assistant Director, with nine Professional Officers, one Superintendent, ten Clerks, Librarian, Storekeeper, nineteen Lay Assistants, thirteen other European employees and 256 Natives.

The expenditure for the year amounted to £54,330 15s. 4d., and the accrued revenue to, approximately, £9,000.

DIVISION OF DAIRYING.

The work of the Division is growing, and Mr. Challis and his staff have been kept busy travelling throughout the Union. His frequent absences on duty during the year have emphasised the need of a Senior Inspector stationed at headquarters to carry on the work of the Division in his absence, and since the close of the year under discussion such an appointment has been made.

The Superintendent draws attention to the necessity for suitable butter boxes, and also to the apparent increase of mould in butter. Investigations of the various sources from which butter may become infected are being conducted by the Division of Plant Pathology and Mycology: the results of which will be published in due course.

The output of creamery butter in 1912 was 705,667 lbs. greater than in 1911 in the Orange Free State, and 492,681 lbs. in the Cape Province, yet the import of butter into the Union during 1912 showed an increase of 703,972 lbs., the figures being as under:—

1912,	4,925,188 lbs.,	valued at	£262,402.
1911,	4,221,216 lbs.,	valued at	£192,987.

The Superintendent ascribes the increase of importation to the fact that merchants under-estimated the local production, anticipating that there would be a shortage on account of the drought.

Mr. Challis' remarks on the cost of running the creameries are deserving of attention. At the present time the expense of conducting many of the Creameries is very high, and if our butter is to successfully compete with butter from Australia and other parts of the world in the English markets, the cost of manufacture will have to be materially reduced.

During the period under review two new proprietary creameries were started at Aliwal North and Burghersdorp respectively, while two others were started at Springfontein and Winburg, in the Orange Free State; which received loans from the Government under the provisions made by the late O.R.C. Government.

It was hoped that the Creameries erected at Standerton and Middelburg by the late Transvaal Government would have been taken over by Co-operative Societies, but as the Societies were not prepared to do so at the present time, they were leased for a period of three years to the Natal Creameries, Ltd.

The attention of the Division has been directed to the formation of cow testing Associations—such Societies are increasing in many dairy countries, and it is very

desirable that they should be inaugurated here. The difficulties connected with them are the same as those experienced with many other enterprises of a similar character, viz.: the distances to be traversed in getting from dairy to dairy, and the cost of supervision, and last but not least to obtain the active and sustained support and co-operation of the farmers. It is hoped, however, that it will be possible to make a start in some of the more closely settled portions of the country.

Arrangements have been made for Mr. Challis to pay a short visit to Australia and New Zealand to investigate the methods of dairying in vogue in those countries, and the legislation and regulations affecting creameries, and the export of butter, and the part taken by the Government to assist the dairy industry.

The staff of the Division as on the 31st March, 1913, was as under:—

Superintendent and two Inspectors stationed at Pretoria.

One Inspector stationed at Cape Town, Bloemfontein and Queenstown, respectively.

There are also fully qualified Lecturers in Dairying at each of the Agricultural Schools.

DIVISION OF BOTANY.

The free distribution of samples of seed to farmers for experimental purposes in the Transvaal, which had been gradually reduced during the last two or three years was discontinued, and in accordance with the Financial Relations Act the control of noxious weeds has been transferred to the Provincial Councils.

Under the circumstances prevailing in the Transvaal immediately after the war the wide distribution of seed to farmers for testing was justified, but though the distribution of seed did a great deal of good in awakening interest and encouraging the farmers to plant good varieties of crops, it was not entirely satisfactory. As a rule farmers were very keen on obtaining seed, but it often happened that the tests were not completed owing to loss of interest, shortage of labour, or pressure of other and more important work. Further the staple crops are now pretty well established, so the necessity for distributing seed of these no longer exists.

Should any new or improved varieties of seed be obtained, which it is desirable to bring to the notice of the farmers, or should the Department need to test the merits of any new variety on an extended scale, samples of seed will be supplied to farmers wishing to try them, but in future the work will be undertaken mainly by the Agricultural Schools and Experiment Stations, which are better able to do it than the Division of Botany.

In consequence of these changes the Botanist has been relieved of a large amount of purely routine and administrative work, and the offices of Assistant for Field Experiments, Seed Storekeeper and Noxious Weed Inspector have been abolished, and the clerical staff has been correspondingly reduced.

In order to assist in the investigation of the veld in the Lamziekte area a Junior Herbarium Assistant was appointed.

With the exception of the Seed distribution in the Transvaal the whole of the Botanical work in progress in the various colonies at the date of Union has been continued, and owing to the appointment of Botanists to the various Agricultural Schools and Experiment Stations, and the improvement of the Plant Pathological Laboratories, and the taking over of the Herbarium at Durban, the provision for carrying out Botanical investigations is greater now than it has ever been.

When the reorganization of the Department took place after Union you were of opinion that the whole of the Botanical work of the Department, with the exception of Plant Pathology and Mycology should be performed at the Agricultural Schools and Experiment Stations, and at the Agricultural College to be established at Pretoria.

The strengthening of the Botanical side of the Agricultural Schools is absolutely necessary, and the testing of varieties of crops, and all experiments with crops on an extended scale should be conducted at them; botanists at the Schools should also be in a position to identify plants, test seeds and advise farmers generally on farm crops, but I feel sure a Division of Botany will also be necessary in order to advise the Department, and to conduct investigations, which crops on an extended scale should be conducted at them; botanists at the Schools. With such an immense amount of work to be done there is ample scope for the Division and the Schools, and with proper direction there need be no fear of clashing or overlapping.

The attention of the Botanist was mainly occupied with the breeding of mealies and the testing and selecting of various grasses and pasture plants, with a view to improving the stock carrying capacity of the veld, which has been in progress since the establishment of the Division of Botany in the Transvaal some 10 years ago, and in continuing the investigations into the herbage of the veld in lamziekte areas, which were carried out in conjunction with the Division of Veterinary Research, the year before.

The Botanist reports that he has succeeded in breeding an earlier maturing variety of Hickory King, an improved grained type of early maize, a drought resistant type suitable for the western portions of the Union, and a type which it is thought will compare favourably with the high priced "Bessarabian" and other South Eastern European types.

So far the lamziekte investigations have been mainly negative, and unfortunately the drought seriously interfered with the experiments projected last season.

DIVISION OF PLANT PATHOLOGY AND MYCOLOGY.

It is pleasing to report that towards the close of the period under review the Division moved into premises most suitable for its work, situate on the slopes of Meintjes Kop, in close proximity to the Union Buildings. In addition to the excellent laboratory accommodation provided, which is fully described in the report of the Division, the property comprises $8\frac{1}{2}$ acres of ground, which is admirably suited for experimental purposes. The necessary greenhouses, etc., will be provided as soon as circumstances permit.

A further addition to the Division took place in the taking over of the Colonial Herbarium at Durban, together with sufficient ground for experimenting with tropical and semi-tropical crops. The services of the Director, Dr. Medley Wood and his assistant have been retained.

The Division collaborates with that of Entomology in the administration of the Agricultural Pests Act, and as a result of a Conference during the year important alterations were made in regard to the precautionary measures governing the importation of potatoes, and these tubers are now, on entering the Union, submitted to fumigation with formaldehyd gas. Full details will be found in the report of the Division of Entomology, which is charged with carrying out the work.

During the period covered by the report 4,589 fungi were added to the Herbarium, including, in spite of the dry season, 740 South African fungi.

The research work conducted by the Division during the year included investigations of Mango Bacterial Disease, Gumming of Wattles, Black Spot of Butter, Red Spot of Cheese, Cereal Rusts, moulds in the Rand mines in connection with a treatment for the prevention of dust and wattle bagworm fungus.

The correspondence for the year amounted to 1,590 letters despatched, and 1,366 received.

Professor Pearson of the South African College continued his investigations into Rooibloem or Witch Weed, and a progress report by him will be found in the appendices. As mentioned in my last report this parasite has caused great damage to mealies in many parts of the Union, and interim reports were published in last year's report, as well as in the *Agricultural Journals* for September, 1911, and May, 1912.

DIVISION OF TOBACCO AND COTTON.

The work of the Division has proceeded on the same lines as in previous years.

The Experiment Stations established in the Transvaal before Union have been maintained, and plans are being made for stations in the other Provinces.

In accordance with the suggestions of the Turkish Tobacco Expert in the Western Province of the Cape Province, steps are being taken to start an experiment station for Turkish tobacco at Elsenburg. The experiments conducted by Mr. Stella on private farms served a very useful purpose, but as Mr. Stella points out, a permanent station is urgently required, in order to investigate many problems which cannot be dealt with otherwise, and also for demonstration purposes, and for training students.

The co-operative tobacco warehouse at Rustenburg, which was established by the Transvaal Department just before Union, is rapidly extending its operations, and last year the Society handled nearly 2,500,000 lbs. of tobacco; the average price received for light yellow tobacco was from 1s. to 1s. 6d. per lb., and for pipe tobacco from 4d. to 6d. per lb. It is estimated that last year the Magaliesberg dis-

trict produced 6,000,000 lbs. of tobacco, and the Union approximately 11,000,000 lbs., the average value of which would probably be about 8d. per lb. If the production of pipe tobacco continues at its present rate the home consumption will soon be overtaken, and there will be a glut unless a market oversea can be found for a portion of the crop.

Enquiries have been made as to the prospects of such an outlet, and it appears likely that markets would be found for the tobacco provided it is properly grown, cured and packed; but it will have to be sold at a price which will enable it to compete with tobacco of similar quality from America.

About 525 acres of Turkish Tobacco were planted in the neighbourhood of Stellenbosch and Paarl last year, the yield from which was expected to be about 210,000 lbs.

The sale of the tobacco by auction in Cape Town has not proved altogether satisfactory, and the tobacco growers have formed a Co-operative Society, and are establishing a warehouse at Paarl for handling and selling the tobacco, and if properly managed and supported the institution should prove of great benefit to the industry. No tobacco has yet been sold, but the price realised last year was 1s. 6½d. per lb., which was not so good as that of the previous year.

The services of the experts have been in great request, and they have undoubtedly been very helpful to the farmers, and the advances which have been made in tobacco growing, particularly in Turkish tobacco at the Cape, and in cigarette tobacco in the Transvaal—two very important and promising branches of the industry—are largely attributable to their efforts.

Experiments in the growth of cotton have been made in South Africa for a considerable period, and for several years careful experiments on a fairly extensive scale have been conducted at the various Experiment Stations in the Transvaal under the supervision of men accustomed to the cultivation of cotton in the United States of America, fortified by the experience they have acquired in this country, and a good deal of valuable information relative to the methods of cultivation, and the yields and merits of the different varieties of cotton is now available.

Last year the yield of cotton at the Stations was poor. At Rustenburg the average yield per acre was 67 lbs. of lint and 135 lbs. of seed; at Barberton 660 lbs. of seed and 198 lbs. of lint; at Tzaneen 64 lbs. of seed and 32 lbs. of lint, while from 4 acres of irrigated land the average yield was 372 lbs. of lint and 727 lbs. of seed per acre. At Piet Retief the crop was destroyed by hail, and at East London by wind and insects.

Mr. Scherffius estimates that approximately 60,000 lbs. of cotton were grown in the Union last year, and sold at an average price of 6½d. per lb. Although as will be gathered from the reports the results of the experiments are not very encouraging, on account of their irregularity, yet a keen interest is taken in cotton growing, particularly in the Western Transvaal, and in the neighbourhood of East London and the Transkei, and it is estimated that 2,000 acres will be planted with cotton in the Rustenburg District this year.

If cotton could be established as a staple crop in the low middle veld and the coast veld, it would be a great help to the country, as lint is always readily sold, and the oil and cattle cake obtained from the seed would both be very useful in the country, as the former is required for soap making, and the latter for feeding to cattle.

Valuable data regarding manuring, cultivation and yields of mealies, soy beans, cow peas and other sub-tropical crops are being provided by the Experiment Stations, in addition to that relative to tobacco and cotton.

Tzaneen Estate.—The Estate was purchased by the Transvaal Lands Department in 1903, for settlement purposes, and a large tobacco factory was erected on it, and operated by the Government, in the expectation of its being taken over and worked on a co-operative basis by the settlers.

The settlement scheme proved premature, and against the strong opposition of this Department the Government transferred the Estate to it. The conducting of the estate as a commercial undertaking, which was not justified, and, indeed, under Government regulations, was impossible, was discontinued. The Tobacco factory, also a purely commercial concern, and likewise involving the Government in a heavy loss, and causing great opposition from private tobacco manufacturers, was closed, and, with the exception of a portion of the Estate used as an Experimental Station for tobacco, cotton, citrus fruits, and other sub-tropical crops, the Department has simply acted as caretaker of it.

In February last, the Lands Department was asked to again take over the estate and dispose of it for settlement, and it is hoped it will see its way to do so. The estate is very fertile, and well watered. A Railway Station has been erected on it, and land is being sought after in the district in which it is situated, so there should be no difficulty in settling it to advantage.

DIVISION OF HORTICULTURE.

Attention is invited to the remarks of the Horticulturist in his report, annexed, as to the requirements of the Division in the way of staff. There can be no doubt as to the necessity of the appointment of a Horticulturist for the Eastern Province of the Cape, and there is also ample work in the Western Districts which would justify the permanent retention of the officer engaged in the inspection of export fruit. At present, owing to the many calls for his services, the Horticulturist is practically constantly travelling throughout the Union, and it is not possible for one man to do this in justice, either to himself or his work.

In my report for last year I drew attention to the desirability of legislation governing Fruit Export; since then owing to the provision in the mail contract, whereunder reduced freight rates are granted for fruit inspected and passed by the Government Inspector, and the corresponding reduction in railway rates, it has been possible to put the inspection, although still voluntary, on a more satisfactory basis. After consultation with shippers and growers at meetings held at Durban, Pietermaritzburg, and Cape Town, regulations as to packing, grading, etc., were drawn up and promulgated.

With the impetus afforded by the reduced rates it is considered that the export of fruit should grow rapidly, and with the inspection to safeguard the market against inferior fruit, the industry has most favourable prospects.

The quantity of fruit (other than citrus), exported in 1912 was a record, 4,096 tons, but the export in 1913, of which sanguine anticipations were entertained, was disappointing; only amounting to 2,970 tons. This was due to the climatic conditions which prevailed in the Western Districts of the Cape (where practically all of the export deciduous fruit is grown), drizzling cold rain and bitter winds accounting for the greater part of the loss, which, however, was partially recouped by the very high prices obtained.

The Horticulturist draws attention to the large quantity of fruit imported into the Union, especially dried and canned goods. There is ample scope for an increase in the canning and fruit drying industries, more especially in the Western Districts of the Cape, where the conditions are favourable, and it is to be hoped that the near future will bring about this expansion.

The thanks of fruit growers and the Department are due to Mr. C. du P. Chiappini, the Union Trades Commissioner in London, for his unremitting exertions on behalf of the industry. The exhaustive reports on the fruit market furnished regularly by him are most instructive and valuable.

Financial statements of the Horticultural Stations are appended to the Horticulturist's report.

A report by Mr. Bulmer, Inspector of fruit for export, on the Cold Storage experiments at Cape Town Docks is appended to the Horticulturist's report.

VITICULTURE.

The report of the Government Viticulturist, shows that a considerable amount of work has been accomplished during the year, although he was much handicapped by the lack of a properly equipped Oenological Institute.

During the period under review 77 wines were analysed, the results of which will be published in the *Agricultural Journal*, and 161 determinations of lime in soils from the Montagu and Robertson Districts were made. The cultivation and study of Cape wine levures were continued, and a preliminary report was published in the *South African Journal of Science* for April, 1913.

Owing to the often reported failures of American stocks, principally Metallica and Jacquez, field experiments are being carried out at various centres, with some 20 different stocks, which, when established, will be grafted with the most important varieties of grapes for each locality.

In addition to lectures before various bodies, the Viticulturist and his Assistant visited a large number of farms for the purpose of investigating diseases, and giving advice on viticultural and winemaking matters.

The erection of the Institute was delayed owing to the change of the headquarters of the Viticulturist from Paarl to Elsenburg, on his assumption of the

duties of Principal of the Agricultural School there. Steps are now being taken to erect the Institute at Elsenburg, and when it is finished, complete and up to date accommodation far in advance of anything at present existing in South Africa will be provided for scientific investigations into wine making.

The reasons for transferring the Headquarters of the Division from Paarl to Elsenburg and for erecting the Institute at the latter place instead of the former, were that it appeared unnecessary to maintain two experiment stations at such close proximity as Paarl and Elsenburg, and seeing that it was imperative that instruction in grape growing and wine making be given to the students at Elsenburg, it was thought best to concentrate the work there, a step which would reduce the total expenditure, and at the same time provide the students with fuller instruction than they would otherwise obtain. Further, it is in the interests of the staff, the students and the public generally for the various educational and investigational agencies, such as Oenological, Horticultural, Poultry, Tobacco and Dairying Stations to be situated in close proximity to each other. Another reason for the change was that, although the station at Paarl is very suitable for experimental purposes, it is limited in area to meet all the requirements of the Division.

Fortunately an opportunity offered of effecting the change before we had become too deeply committed to the Paarl site, and when the principalship of Elsenburg became vacant, the Government Viticulturist, Dr. Perold—who is also well qualified to take charge of Elsenburg—was appointed to that office in addition to the one he occupied.

The Paarl Station upon which a varied and extensive collection of vines has been planted, will be used as a sub-station, the expense of maintaining it will be small, and it will act as a complement and useful annex to Elsenburg. No new Buildings were erected thereon, merely repairs and alterations have been carried out, so that there has been no expenditure which can be regarded as fruitless.

The 1912 vintage was remarkable, and the quantity of wine produced for that year was one of the largest on record. The 1913 vintage, on the other hand, owing to the cold weather towards the end of 1912, exhibited a marked falling off; in some districts not much more than half the previous year's output was attained.

Satisfactory prices were obtained for wine during both the vintages. In 1912 farmers obtained from £4 10s. to £8 per leaguer, and in 1913 from £5 to £10, the average prices for the 2 years being £5 and £6 per leaguer, respectively.

For brandy the prices in 1912 were, Dr. Perold states, wine brandy £20 to £24 per leaguer, grape brandy £15 and £16, and in 1913 wine brandy rose to from £25 to £40, the price of grape brandy remained unaltered.

GOVERNMENT WINE FARM, GROOT CONSTANTIA.

This farm has been maintained on the same lines as in previous years. The vintage of 1912 amounted to 18,256 gallons, being 645 gallons more than that of the year before.

The vintage for the district was abnormally heavy; in some cases amounting to 900 gallons per acre. This year the vintage amounted to 14,382 gallons.

Wine making was carried out under favourable conditions; the grapes were sound and healthy, and the sugar contents well maintained.

The fruit crops were very poor. The receipts for the financial year 1912-13 amounted to £2,554 11s. 4d., and the expenditure to £2,142 1s. 6d. The farm which is entirely devoted to wine-making and fruit growing is 297 acres in extent, and there are 103 acres of vines and 56 acres of pears and other fruit. The total cost of working the land and wine-making for the year, including supervision, per acre of wine and fruit land amounted to £13 9s. 5d., and the cost of labour alone to £4 15s. 6d.

DIVISION OF ENTOMOLOGY.

The Chief of the Division draws attention to the fact that the administration of the regulations dealing with diseases of plants and other work of a routine character has prevented the Division engaging in research to the extent it should. Unfortunately this is so, as the Division like many of the others is still understaffed, but when the two Assistant Entomologists, Messrs. Brain and Gunn, now studying abroad, return, and the Assistant for whom provision has been made on the Estimates is appointed, the Division will—if not equipped as fully as could be desired—be placed in a much better position.

During the year the regulations issued under the Agricultural Pests Act, 1911, was brought into force, and in order to assist in the administration of these, and to deal with correspondence and other pressing matters concerning the Division in the absence of the Chief, Mr. Fuller was transferred from Pietermaritzburg to Pretoria.

On account of the injury caused to wattle trees in Natal by the bag worm and other insects, Mr. Hardenburg was detailed to investigate the matter. He is established in a small Field Laboratory at New Hanover, in the midst of the wattle area, and has been provided with a qualified assistant recently obtained from the U.S.A.

The present condition of pernicious scale is set forth in the Entomologist's report. When the disease was first discovered in Pretoria in 1911, it was hoped that it was of recent occurrence, and limited in distribution, and that it would be possible to eradicate it by destroying all infected and suspected plants, but it soon became apparent that the disease had been present since 1906, if not before, in two nurseries in Pretoria and Pietermaritzburg, and that it was found in 27 different centres in the Transvaal, Natal, and the Orange Free State; under the circumstances it was considered that it would not be justified in continuing the destruction of infected plants and plants liable to contract the disease in these vicinities, and so commit the Government to big and indefinite expenditure without any assurance, or indeed much hope of the disease being ultimately eradicated, for experience has shown that when once a disease like pernicious scale becomes firmly established, the chances of extirpating it are but small.

During the year important changes were made in the regulations governing the importation of potatoes, fumigation with formaldehyde gas being adopted in place of sorting by hand.

After consulting several eminent authorities, the Entomologist has come to the conclusion that the disease amongst bees existing in Johannesburg, is not foul brood.

The Union was practically free from locusts during the year.

DIVISION OF CHEMISTRY.

The report of the Chemist shows that at present he is overburdened with work, and that an increase of the staff of the Division is urgently required. Provision has been made on the Estimates for 1913-14 for an Assistant Chemist, and two more at least are needed.

The building in which the Chemist is housed is very unsuitable, and it is hoped that the increase of staff and proper accommodation will be forthcoming at an early date, as without both it will be impossible for the Division to do justice to the work expected of it.

The Chemical Laboratories at the Agricultural Schools and Experiment Stations are getting under weigh.

The Agricultural chemical work in the Transvaal has been performed in the Laboratory in Pretoria, and in Natal at Cedara, and in the Cape and Orange Free State, pending the provision of the necessary staff and equipment at Elsenburg, Grootfontein and Glen, in the Laboratories of the Department of the Interior, and our thanks are due to the Secretary for the Interior for permitting the officers to do the work, and to Drs. Juritz, Lewis and Targatt Adams for carrying it out.

446 samples of soils and other substances of agricultural interest were submitted to the Division for examination and report, and a careful personal inspection was made by the Chemist of the phosphatic deposits at Weenen, Natal.

The soil analyses furnished results similar to those of last year, the average percentage of nitrogen being fair, and of lime and available phosphoric acid very low.

A number of samples of feeding stuffs, fertilizer and other stuffs made from Prickly Pear were analysed, but none of them showed much promise of usefulness.

A number of different varieties of maize were analysed for Dr. Macaulay, M.I.A., in connection with some investigations he is making into their value as food for the natives on the Mines.

The superiority of the flint variety over the dent variety in protein, and the poverty of the maize grain in lime were clearly shown.

Mr. Williams, the Chemist at Cedara is engaged in investigating the tannin content of wattle bark, with a view to devising a method of grading the bark according to its composition, and of ascertaining the influence of soil, climate, age and varieties of trees and other factors on the value of the bark.

A Conference of the Chief Chemist and the Chemists at the Agricultural Schools will shortly be held in Pretoria for the purpose of discussing matter of

common interest, and arriving at an understanding as to the work to be performed at the various Institutions, the lines on which it should be conducted, and so forth.

Dr. Theiler, who is now in Europe, is endeavouring to secure the services of a physiological Chemist, whose first duties will be to investigate lamziekte from a chemical standpoint. As pointed out in my previous report there is a great need for chemical research, as there are many problems relating to the amelioration of the soil, the growth of crops and the feeding of animals, which can only be solved by the help of the Chemist.

A survey of the soils of the chief agricultural areas of the Union is also needed, and will, it is hoped, soon be systematically undertaken. While on the subject of soils it may be pointed out that although chemical analysis of soil may assist the farmers to a certain extent, yet with the exception of indicating an actual deficiency of plant food, or the presence of some injurious substance—occurrences which are not common—they do not furnish conclusive evidence of what manures are most suitable for any particular soil and crop, and the only way of ascertaining this is by actual tests in the field. If a farmer will obtain small quantities of lime and a few general and special manures like kraal manures, guano and meat and bone meal, nitrate of soda or sulphate of ammonia, superphosphate and basic slag, and some form of potash, and apply them to his crops in the ordinary way, and note the results, he will have the best possible information of the kind of manure suitable for his purpose. The same remark holds true of crops. The only way of finding out definitely what crops are or are not adequate to any particular soil—provided the climatic and other conditions are suitable—is to try them.

If any information is required as to the most promising manures and seeds to experiment with, or the best way of carrying out the tests, the Department will gladly supply it.

The amalgamation of the whole of the chemical work of the Government under one head has been strenuously advocated by some, but personally I think the existing arrangements, whereby agricultural chemistry is dealt with by this Department, and the chemistry for Public Health, Justice, Customs and Excise, is dealt with by the Department of the Interior, is the most satisfactory that can be arrived at.

It is only by becoming intimately acquainted with the industry whose interests he is engaged to promote, and the conditions under which it is pursued that a scientist can devise a method of assisting it, and for this reason it is better that Agricultural Chemistry should be dealt with separately, just as the chemistry of Public Health, wine making, brewing, tanning, dyeing and other important industries is. The chief arguments advanced in favour of the consolidation of the whole of the chemical work of the Government are that it would be more economical and efficient, but I respectfully submit such would not be the case.

Provided there is sufficient work to occupy the whole of the various chemists and their assistants, and to justify the laboratory accommodation and equipment required by them, no saving would be effected by centralization or by placing the work under one head, whilst it is certain a serious loss of efficiency would result; even within the Department itself a certain amount of decentralization of chemistry is advisable; for instance, a physiological chemist could work to better advantage at the Veterinary Research Laboratory than in the Division of Chemistry; the Chemistry of wine making can be better undertaken in the Oenological Institute, and the investigations into wattle bark better at Cedara than in a central Laboratory. This is the principle adopted in the United States Department of Agriculture, where, in addition to the Bureau of Chemistry, important Bureaus like Animal and Plant Industry and Soils each have their Chemists, and also at the University of Cambridge and other Universities that could be named where, in addition to the University Professors of Chemistry, there are Professors of Agricultural Chemistry, each with their separate Laboratories.

Systemization and centralization may be excellent in their way, but in the case of scientific investigation they may be carried to excess, and seriously reduce the amount and value of the work done. It is, of course, desirable from every point of view that duplication and overlapping should be avoided, and that as regards analyses and so forth, there should be uniformity of method, so that the results obtained in different laboratories can be compared, but scientific men cannot always be dealt with as administrative and clerical officers, or as members of commercial or industrial concerns, for the quantity—and what is yet more important—the quality of their work depends upon their competence to undertake it, their interest in it, and the facilities afforded them for pursuing it.

To amalgamate the whole of the chemical work of the Government would, I feel sure, not result in any real economy, and would prove very detrimental to agriculture. There would be a danger of men of general qualifications being entrusted with the work, instead of specialists, and if good men were obtained, of their work suffering through their not being so closely in touch with the various phases of agriculture, and so appreciative of the needs and difficulties of the farmers as they would be if they were attached to this Department and independent of any other branches of chemistry.

DIVISION OF PUBLICATIONS.

In October, 1912, Mr. F. D. MacDermott resigned his position as Chief of the Division, in order to engage in farming; the thanks of the Department are due to him for successfully establishing the *Agricultural Journal*. The position thus vacated was filled by the transfer of Dr. Macdonald from the Division of Dry Farming.

During the period under review the energies of the Division were employed in editing and publishing the Journal, and in translating the Journal and the Departmental reports. No bulletins, leaflets or other publications, except reports for the Journal were issued since the 1st January, 1912, but it is hoped more will be done in this direction during the ensuing year, as there is a great need for the diffusion of information on agricultural matters by means of leaflets or circulars, and bulletins similar to those distributed so freely in the United States of America, Canada, and in Great Britain, where great attention is given to the education of the farmers through the medium of the press. When the Journal was started a charge of 2s. per annum was made for it. The charge was imposed in order to prevent the waste which is unavoidable with a free mailing list, and it was thought that the small sum charged for it would not deter anyone really interested in the Journal from obtaining it. The circulation of the Journal, however, diminished instead of grew, as it was hoped it would, until in April, 1912, there were only 9,000 subscribers to the English edition, and 1,000 to the Dutch, and in view of this fact, and of the representations made by the Government Printer in a Minute dated the 18th April, to the effect that the average monthly cost of the two editions of the Journal, after deducting the revenue for advertisements was £413, and that if the Journal were issued free, and its value as an advertising medium increased on account of its larger circulation, it could be produced at a net cost of £150 per mensem, it was decided to abolish the charge, and to issue the Journal gratis to bona fide farmers.

The circulation of the Journal is now 24,500 copies of the English edition, and 9,500 copies of the Dutch edition.

LIBRARY.

The efforts to render the Library of the Department as useful and complete as possible have been continued, and it is now the best collection of agricultural literature in the Union. 572 new books were added during the year, bringing the total number of *bound volumes* to 3,288. In addition to these there are 10,848 books in the Divisional and School Libraries; 1,116 periodical publications were received in exchange or by subscription in the Library, and 558 by the Divisions and Schools.

The Director of Prisons has offered to do any binding that may be required by the Library free of charge, and advantage is being taken of his courtesy to have bound the large number of Journals, transactions of learned Societies and other periodicals and papers that have accumulated in the Library.

Hitherto a great deal of inconvenience and loss of time has been experienced on account of the Library being housed apart from the Department, but this drawback will be overcome when the Department moves up to Union Buildings, as excellent accommodation has been provided for the Library in the centre of the departmental offices.

The Library is maintained essentially for the use of the Department, but it is also open to the public, and is becoming increasingly used by persons outside the Department for the purpose of reference.

There is a considerable demand for agricultural books, and I am of opinion that the establishment of a circulating agricultural library for the Union is well worth considering.

The staff of the Division consists of the Editor, Assistant Editor, 2 Translators, 1 Clerk, 3 Typists, and the Librarian and his Clerk.

DIVISION OF CO-OPERATION.

The work of the Division has been mainly concerned with the supervision of Co-operative Societies in the Transvaal, as the Transvaal and Orange Free State are the only Provinces which possess the legislation necessary for the establishment and control of Co-operative Societies on a truly co-operative basis.

The main principles of the Co-operative Acts in those Provinces are that the members of a Society are collectively and severally liable for all the transactions of the Society.

As will be seen from the report of the Chief Inspector of Co-operative Societies, which gives a detailed account of the membership, transactions and conditions of each Society, there are now 20 Societies in active operation in the Transvaal, and one in the Orange Free State. Six Societies ceased to exist during the year, for reasons given in the report, and three Societies—2 in the Transvaal and one in the Orange Free State—have not yet conducted any business. The business of the Societies consisted chiefly of the sale of mealies, forage and other agricultural produce and tobacco, and the purchase of agricultural implements.

The growth and circumstances of the Societies will be gathered from the following figures:—Total membership of the Societies in 1911 was 9,948, and in 1912 11,558; total turnover 1911, £671,035; 1912, £794,721.

The most noteworthy Society is the Magaliesberg Tobacco Society, which, although only two years old has 1,615 members, and a reserve fund of £8,000, and during the year handled and disposed of no less than 2,496,635 lbs. of tobacco.

With the exception of a few Societies which are not altogether satisfactory, marked improvements have taken place in the manner in which the Societies have conducted their affairs, and in their finances. Through the medium of the Central Agency the Societies have been able to eliminate the middleman or middlemen as the case may be, and to enter into contracts directly with the Mines, Railways, and other large consumers, or with buyers at the ports or oversea. In this way better prices have been obtained for mealies, wool, tobacco, fruit and other agricultural produce than would have been realized under the old methods of disposal.

The staff of the Division appears large for the number of Societies, but at this stage of their existence the Societies require a good deal of supervision and advice, and it is to be feared that if the attention now paid to them is diminished they may fall into unbusinesslike ways, and the movement, which is very promising, receive a set back.

The Land Bank enquires into the accounts of Societies which have received advances from it, and it has been suggested that the supervision which must necessarily be exercised by the Land Bank in order to protect its interests, is such as to render any further supervision by the Department unnecessary. The objection to this course is that the Bank might not manifest as keen an interest in preaching and assisting co-operation as the Division does, or be as generally helpful and sympathetic to the Societies. Further, many Societies prefer to do business with private banks rather than with the Land Bank, and at the present time the advances from private banks equal, if not exceed those obtained from the Land Bank, and the tendency is for Societies to go more and more to private banks. It may also be urged that inspection by the Division should suffice for the Bank, but this, too, would be open to objection on the score that that body whose mission it is to promote co-operation, might err on the side of leniency in its anxiety to assist the Societies, though of course, owing to the fact that the members of a Society are collectively and individually liable for the debts of the Society, any reasonable advances would be amply secured.

Though for the reasons given the activities of the Division have been chiefly exercised in the Transvaal, the co-operative movement is by no means limited to that Province. As stated in my last report a number of Co-operative Wineries, Creameries, Fencing and Boring and Windmill syndicates had been formed in the Cape Province before Union, and there were also several Co-operative Creameries in the Orange Free State, and there is a Co-operative Dairy and a Farmer's Co-operative Society in Natal, which according to a recently issued report had a membership of over 900 last year, and a turnover of a quarter of a million, sterling, and the most recent addition to the list of Co-operative Societies is the Western Province Tobacco Growers Co., Ltd., which has its headquarters and warehouse at Paarl. The objects of these Societies are the same as those in the Transvaal Societies, that is to say they are run for the members for the purpose of marketing their produce, and for purchasing implements, fencing material, seeds, manures, and other farming requisites, but

the Government has no jurisdiction over any of them, except those having loans from it, in which case, of course, it has the right to enforce whatever conditions were imposed upon the Societies when the loans were granted.

The Co-operative Societies in the Cape have had a chequered career, some have failed, others are just keeping their heads above water, and a few are prospering. The Wineries and Creameries have fared the worst and as a result of enquiries made by a select committee of Parliament on certain recommendations of the Treasury, which are embodied in a memorandum presented by that Department to Parliament, Parliament agreed to write off a sum of £54,000. A detailed account of the finances of the Co-operative Societies in the Cape in receipt of loans for Government is given in the Report of the Auditor-General.

There are many reasons for the failures or partial failures that have occurred.

In some cases Societies were formed without due consideration of the probable amount of business to be transacted by the Society; the granting of money too easily and in too large amounts by the Government; bad management and lack of support by the members were the undoing of others.

DIVISION OF BRANDS AND FENCING.

During the year the work of this Division was greatly curtailed. This action was rendered possible by the passing of the Land Bank and Fencing Acts, and by the improvement in respect to East Coast Fever.

With the exception of the Zoutpansberg District, the branding of cattle which had been carried out by the Division in the portions of the Transvaal infected with East Coast Fever was discontinued, as the disease had ceased to exist. The branding of cattle in the Zoutpansberg is nearly completed, and the branding officers, who have also been employed as stock inspectors, are to be transferred to the Veterinary Division.

Branding with a three-piece brand, such as that recommended by the Division, is very useful in dealing with diseases like East Coast Fever, which are conveyed by movements of cattle, as it acts as a deterrent to movement, and enables cattle which have strayed or illicitly moved to be identified, and the farm or other area from where they came ascertained, but the branding of large numbers of cattle scattered over considerable areas, and the calves as they are born, is a very expensive operation, and the time it takes to carry out detracts from its value as a protection against the spread of disease; further, the extension of fencing has reduced the risk of cattle straying, and rendered the surreptitious movements of cattle more difficult.

In view of these facts it was decided not to continue the branding of cattle by the Department, except under exceptional circumstances.

During the period under review 1,330 brands were registered in the Transvaal, 424 in the Cape, and 27 in the Orange Free State.

Owing to the abatement of East Coast Fever in the Transvaal, the fencing of farms on account of the disease, which formerly occupied a large staff, almost entirely ceased.

The Union Fencing and Land Bank Acts have greatly simplified and reduced the cost of administration, the former by repealing the Fencing Acts previously in force in the different Provinces—no less than 40—and substituting a simpler and more effective one; and the latter by making provision for all advances for fencing to be made by the Land Bank.

The passing of the abovementioned Acts, together with the decrease of East Coast Fever in the Transvaal, made it possible to close down the depots established by the Transvaal for supplying material for East Coast Fever fencing, and to farmers obtaining loans from the Land Bank.

Some idea of the immense amount of work involved in the clearing up of fencing matters in the various Provinces and in re-organizing the Division may be gathered from the report of the Controller of Fencing. Early in the year Mr. J. J. Pienaar, Controller of Fencing and Registrar of Brands, was transferred to Defence, and was succeeded by Mr. W. J. Nussey, who was second in command. Mr. Pienaar was an able and willing officer, and the thanks of the Department are due to him for the assistance he rendered to it.

On the 1st January, 1912, the staff of the Division consisted of 57 persons, mainly on temporary engagements, and early in the year 4 additional temporary officers were engaged to assist in clearing up the accounts and so forth. In the course of the year the staff was reduced to 13, and it is expected that in another month or so it will be brought down to 5, at which it will probably remain, till the amount of work devolving on the Division under the new conditions is seen.

As far as can be ascertained the new Fencing Act is satisfactory. Few, if any, complaints have been made of it, and fencing is proceeding briskly. The portions of the Act compelling adjoining owners to contribute towards the cost of dividing fences were permissive, except in the cases of areas in which similar legislation was in force at the date of the passing of the Act. The areas in which the clauses in question operated automatically comprised the whole of the Orange Free State, and of Natal—with the exception of Zululand, and the districts of Utrecht and Vryheid—and a considerable portion of the Cape Province, and since the passing of the Act the clauses have been applied to the whole of two districts in the Cape, and to certain wards in three other districts, to certain wards in 6 districts in the Transvaal, and to 2 Magisterial Divisions in Natal. So there is a good prospect of the whole of the Union, with the exception possibly of certain dry and very thinly populated portions of it being shortly included within the scope of the Act.

Though branding of stock is perhaps not so urgent and weighty as fencing, yet it is a matter of no little importance to farmers, inasmuch as it tends to prevent theft and the spread of disease, and facilitates the recovery of animals that have gone astray.

Further, the kind of brands and the method of branding adopted by many farmers greatly reduces the value of the hides, and from every point of view it is highly desirable that an up-to-date and uniform system of branding should be initiated in the Union.

DIVISION OF DRY FARMING.

Dr. MacDonald, Chief of the Division and, before Union, Editor of the *Agricultural Journal* and Dry Land Agronomist for the Transvaal, was transferred to the Division of Publications, and was succeeded by Mr. H. S. du Toit, Manager of the Lichtenburg Dry Land Experiment Station, which office he still retains.

The Lichtenburg Station has been conducted on the same lines as heretofore; as in previous years the yields were not heavy, but considering the quality of the soil, and that practically no manure was used, they may be regarded as fairly satisfactory. There were some failures, and a certain amount of damage was caused by hail and unfavourable climatic conditions, and by white ants, but probably not more than the experience of previous years would lead one to expect, and a prudent farmer would allow for.

As stated in my last report, as the Station is entirely devoted to demonstrations and experiments in dry farming, it affords a better opportunity for obtaining information of the cost of equipping and working an arable farm than is provided by general Experiment Stations, though it is obvious that the cost of conducting any experiment station must be higher than that of running an ordinary farm, and the revenue much less; for in the case of the one, information and instruction are the features aimed at, whilst in the other profit alone is considered. During the year 360 acres were cultivated, of which 196 acres were fallowed, 48 acres were sown with crops for green manuring, and 40 acres with crops for feeding the draft animals. The only animals kept on the stations were those used for draft purposes or for journeying to the station, a distance of about 3 miles. 300 fruit trees and 3,000 Eucalyptus trees were planted, and the ground prepared for another 15,000 to act as wind breaks, and the following permanent improvements were effected: 2,000 yards of fencing and 500 yards of road. The total expenditure on the Station during the present financial year, after deducting half of Mr. du Toit's salary, and three-fourths of his travelling and subsistence expenses, amounted to £1,490 15s. 6d., and the sales and transfers to other Departments to £164 3s. 11d. Twelve labourers were employed on an average, and the following draft animals:—53 oxen, 7 mules, and 2 horses.

The cost of labour per acre of ground cultivated amounted to £1 19s. 4d. per acre, and the total cost of running the farm, including supervision, but not taking into account interest on capital invested, permanent and other improvements, implements and stock (about £1 per acre of land cultivated), amounts to £3 9s. 8d. per acre.

Small dry farming stations have been established at Pretoria, Warm Baths, Pietersburg and Prieska, and it is expected stations will be started at De Aar and Graaff-Reinet. At each of these places, with the exception of Warm Baths, the local Municipalities are co-operating with the Department by furnishing sites for the stations, and in most cases bearing half the cost of conducting the station. Experiments and demonstrations in dry farming are also being undertaken at Grootvlei, Orange Free State, Grootfontein, and Vryburg.

In addition to supervising the Experiment Stations Mr. Du Toit has been busily engaged on lecturing on dry farming in various parts of the Union, and in replying to enquiries by letter on the subject.

A largely attended and most successful Dry Farming Congress was held at Bloemfontein.

Though there is nothing novel in the principles of Dry Farming, the enthusiastic preaching of the gospel of dry farming by the Division, and by the Dry Farming Congress, and the demonstrations which have been conducted at the different stations have undoubtedly exercised a wide-spread and deep influence upon the agriculture of the Union, by inducing farmers to devote more attention to the timely and proper cultivation of the ground, and to put to profitable use large areas of ground which, but for the enlightenment and stimulus afforded by the agencies referred to, would probably not have been cultivated at all.

The drought furnished a striking illustration of the value of dry farming methods, for not only were the crops growing upon land which had been properly cultivated, and suffering far less from drought than the crops in indifferently cultivated ground, but the farmers who had ploughed the land early and continued to stir the surface during the drought, were able to take advantage of the first rains, and by getting their crops in at once to reduce the risk of their being cut by frost in the autumn, whereas the crops of the farmers who followed the old custom of postponing ploughing till the spring rains, were in most cases hopelessly belated.

GUANO ISLANDS.

The year 1912 shows a marked improvement on the preceding one. The yield of guano in 1911 was unusually low, viz., 4,647 tons, but in 1912 it amounted to 6,372 tons—a very fair average. The whole of this, with 1,246½ tons of the quantity left on the Islands from the previous year, was shipped to Cape Town for distribution.

The quantity of guano disposed of during the year amounted to 7,863 tons.

Formerly the supply of guano was sufficient to meet the demand, and consequently the sale of it was simple, as orders from farmers for guano were dealt with as received, but during the past two or three years applications for the guano have been far in excess of the supply. In order to meet the situation thus created, it was decided to discontinue the system of supplying applications for guano in full in the order in which they were received, and to dispose of the guano twice a year only—shortly before the Spring and Autumn sowing seasons.

Early in the year notice was given that 4,450 tons of guano would be available on the 1st March, for which applications amounting to 10,783 tons were received. The applications were considered by a Committee consisting of the Chief of the Division and Dr. Juritz and Dr. Perold, who recommended the following distributions, which was carried out:—

Order for 10 bags or less, allotted in full.

Order for 11-70 bags, half the amount applied for, with a minimum of 10 bags.

Order for 71-360 bags, one-third of the amount applied for, with a minimum of 35 bags.

Order for 361 and upwards, One quarter of amount applied for, with a minimum of 120 bags.

The system is not perfect, but on the whole it worked well, and with a few amendments will probably be found to be the best that could be devised.

The next allotment, for which it is hoped 15,000 bags will be available, will take place in June or July.

The small branch depots which were maintained at Clanwilliam and Storm's River have been closed, as it was found that on account of the extension of the Railways and the reduction on rates for manure, guano could be supplied cheaper direct from Cape Town than through the local depots. Further, owing to the guano from the various Islands which was received at Cape Town, being thoroughly mixed, the manure was more uniform in quality than that from the depots which was supplied from particular Islands.

The total number of seal skins taken during 1912 was 6,209, as against 5,069 the previous year, and the average price per skin realized was 28s. 10¼d., as against 30s. 6½d.

[U.G. 47—'13.]

The crop of penguin eggs—again confined to Dassen Island—was 400,500, and realized £2,053 11s. 3d.

The quantity of seal oil sold was negligible; there being no demand for the product.

Negotiations in regard to the better regulation of sealing off the Coast of German South West Africa, resulted in the beginning of 1913 in the German Government consenting to this matter forming the subject of discussion between representatives of the German South West African and Union Governments, and it is hoped that this matter will now be settled satisfactorily.

The expenditure during the financial year amounted to £25,579 19s. 3d., and the revenue to £37,604 17s. 6d., of which sales of guano accounted for £28,570 3s. 9d. The nett profit for the year, according to the Profit and Loss account came to £14,924 19s. 1d.

VRYBURG COLD STORES.

Shortly before Union the Cape Government established a Cold Storage at Vryburg, with the object of assisting the Dairy industry in those parts. The chief functions performed are the icing of cool cars for the transport of dairy produce between Vryburg and Kimberley, and the cold storage of butter, and the supply of ice for use in the town of Vryburg.

There can be no doubt that considerable assistance has been given to dairying in Bechuanaland by this means, but unfortunately the running of the stores has resulted in a heavy loss, as may be seen from the financial statement attached to the Superintendent of Dairying's report.

The Select Committee on Public Accounts last year recommended that steps be taken to close down the stores, and, after careful consideration, the Government decided to do so at the end of the present financial year. Opportunity will be given to those interested in the dairying industry to take the stores over and run them, as a private undertaking.

The Stores comprise 2 cold rooms, one capable of containing about 3,000, and the other about 4,000 cases of butter, and there is an ice making plant capable of turning out about $2\frac{1}{2}$ tons of ice per 24 hours.

The revenue for the financial year 1912-13 was £464 9s. 4d., and the expenditure £906 5s. 6d. The loss on the undertaking, taking into account interest and depreciation, being £838 6s. 7d., for the year.

DIVISION OF GRAIN.

The Division has been occupied in grading maize and oats previous to export, and in dealing with other matters affecting the export of grain.

The work performed by the Division continues to give satisfaction; only one complaint about grading was received by the Department, and this was not justified, as it was due to the mixing of two grades by the Shipping Company when delivering the grain, and not to an error in grading.

The annual Conference of producers and exporters of maize, shippers and representatives of the Department of Railways and Harbours and of the Department was held in April, 1912; a list of the resolutions together with a statement of the action taken thereon, is attached to the report of the Chief Inspector of Grain.

The export of maize for the year 1912 amounted to 832,742 bags by sea, and about 200,000 bags to Rhodesia and the Portuguese Territories, as against 1,016,443 bags exported in 1911. The number of bags of maize rejected for dampness showed a considerable decrease, being 45,699, as against 147,302 the year before.

The export of graded oats was 99,079 bags as against 13,121 bags in 1911.

Under normal conditions the export of maize, as in other years, would not have exceeded the surplus remaining after the home requirements had been met, but on account of the general and prolonged drought an unexpectedly large amount of maize was needed for feeding to live stock, with the result that there was a shortage of maize, and some 30,000 bags of South African maize were re-imported from Europe, and 170,000 bags were imported from the Argentine and the United States of America.

The imported maize compared very unfavourably in quality and condition with the South African maize, and was put in such poor bags that large quantities of grain were lost in the hold of the ship, and on the wharves and sheds at the docks.

In order to relieve the situation created by the shortage of maize, it was suggested by certain persons that the import duty on maize should be temporarily suspended, but as the duty was fixed by Act of Parliament it was impossible to alter it except by another Act. It was also suggested that steps should be taken to prevent the over export of maize in the future, and that instead of encouraging the

export of maize by low freights, and so forth, it should be discouraged. The subject is one on which there is much to be said from many points of view; the encouragement given to the export of maize has undoubtedly had a most beneficial effect. Before facilities were given for the export of maize, farmers were constantly in fear of over production, and of a slump in price, with the result that there was rarely sufficient maize produced in the country to satisfy its requirements, but now owing to the outlet which has been provided there is no longer any danger of over production, with the result that not only has the production of maize been increased, but owing to the introduction of grading the quality has been improved. The result of the increased production has been to steady the price of maize in South Africa, and to alter the balance of trade, and to bring into the country in 1911, £402,680, and in 1912, £443,492, and to provide a large amount of valuable food in the shape of mealie stalks for cattle.

In the United States of America some twenty years ago maize was freely exported, but as farming progressed, more and more maize was needed for feeding to stock, and less and less exported, and the same thing may be expected to take place here. The restriction of exports in order to prevent shortage such as that which occurred last year would be difficult. A good system of crop forecast, such as it is hoped will be shortly forthcoming may help, but it must be remembered that such forecasts are only estimates, and although carefully framed cannot be expected to be more than approximate for such a vast country as this, and secondly it is impossible to foresee droughts like that which caused the trouble last year. If the mines and other large consumers of mealies enter into contracts as many of them do for mealies for 12 months ahead, soon after harvest, and if farmers exercise a little prudence and maintain a reserve for their stock in case of drought, I do not think there will be much danger of over exporting. Of course if maize is fetching a high price oversea at the commencement of the export season there will always be a temptation to export, and for the State to interfere under such circumstances would be very difficult. Owing to the drought the maize was sown very late last year, and although the area sown was probably greater than the year before, it is probable that the total yield may be below the average, and the quality poor.

Ostriches:

Experiments in the breeding and management of ostriches have been carried on at the Grootfontein School of Agriculture and Experiment Station, and by Professor Duerden at Grahamstown, and investigations into diseases of ostriches which are becoming more prevalent, and occasion heavy losses at times, particularly amongst chicks—are being conducted by the Division of Veterinary Research.

Mr. Thornton's report which deals with the birds imported from North Africa in 1910, and with the birds at Grootfontein, is incorporated in the report on Vote 7—Agricultural Education—and Professor Duerden's report is included in the appendices to this report.

Professor Duerden, who is Professor of Zoology at Grahamstown, has interested himself deeply in ostriches, and the investigations which he is carrying out—towards the expense of which the Department makes him a grant of £250 per annum—cannot fail to be of assistance to the industry. Professor Duerden's remarks on the ostriches of British East Africa, should be noted.

There are many problems connected with ostrich farming requiring attention, and as the industry is such an exceptional one, and of such importance to the country, it is highly desirable that a Division, which should include a properly equipped Experiment Station, should be established for the express purpose of assisting it, and it is to be hoped that adequate provision for the same will be made on the next Estimates.

STATISTICS.

Agricultural Statistics are still lacking, but the Government has decided to maintain a permanent Census office under the Department of the Interior, which will include amongst its functions the collection and publication of statistics of production and estimates of the condition and yield of the principal crops. In order to obtain the latest information on the subject, Mr. Moffat, the Director of Census was sent to Europe and the United States of America and Canada, to study the methods of obtaining and publishing agricultural statistics in vogue in those countries, and to attend the bi-annual Conference of representatives of contributing countries at the International Institute of Agriculture in Rome. One of the chief

duties of the Institute is to collect, in a convenient form for reference, agricultural statistics from all the countries of the world, and it is obviously desirable that, as far as possible, this country should fall in line with other countries and collect its statistics on the same basis as they do. Arguments could be advanced in favour of agricultural statistics being dealt with by this Department, but that would have involved the formation of a new and extensive Division, as at present this Department has no machinery available for undertaking the whole, or even anything beyond a small portion of the work, and in order to avoid the creation of two Divisions of Statistics, which might possibly overlap to a certain extent, and lead to a duplication of highly paid officials, it was deemed advisable to entrust the work to the Census office.

As far as the year under review is concerned practically the whole of the statistics that in the ordinary way would have been furnished by a Division of Statistics, were collected and published by the Census authorities.

The Department is often asked the cost of various kinds of farming or branches of farming, such as dairying, pig keeping, the growing of certain crops and so forth, and the returns that may be expected therefrom, and such data would undoubtedly be most useful, but it must be accurate, or it will be worse than useless, and to obtain such information is a far more difficult matter than one would think. To endeavour to arrive at the cost of producing mealies or any other crop by taking an acre of ground and debiting it with the cost of the seed and manure, and the various tillage and harvesting operations, calculated on the exact time taken by men and draft animals to perform them, and a small sum for interest on capital, rent, and so forth, is very apt to be misleading, as the general charges on the farm and the risks incurred are usually wholly ignored, or much underestimated. These charges include the cost of supervision, renewal and repairs to buildings and implements, petty expenses, the value of the time occupied by men and draft animals moving from one job to another, or lost through inclement weather; the cost of repeating operations through the whole or partial failure of crops from various causes, and of purchasing artificial food for live stock in times of scarcity; the necessity of a farmer having to employ more men and draft animals on a farm at certain seasons of the year than are actually required in order to be prepared for a rush of work at other seasons is also often not taken into account, nor is sufficient allowance made for losses directly and indirectly occasioned by drought, floods, hail, untimely frosts, and diseases of live stock and crops.

One has but to compare many of the estimates which are published of the cost of growing crops, obtained in the manner indicated, with the actual cost of running a farm for a year to see how hopelessly wrong they are. The only reliable way to obtain the cost of production is to select a farm, or better still farms—so as to obtain an average, which makes a speciality of particular crops or stock, and after deducting the value of any permanent or exhausted improvements, to dissect the accounts and divide the total expenditure amongst the various crops and live stock.

An attempt to provide a certain amount of information has been made by giving the cost per acre of manual and animal labour at certain of the experiment stations, which are more or less confined to particular crops such as tobacco and cotton, fruit and dry land farming, on which experiments are conducted on an extensive scale, and in a practical manner, but even this is only approximate, though a study of it will show that the cost of cultivating an acre of ground is considerably more than it is often calculated to be, and that the losses through failure of crops are considerable.

In addition to the collection of statistics a study of the economics of agriculture is greatly needed, and it is to be hoped that provision will be made for it to be systematically undertaken.

Although no statistics have been collected for agricultural purposes alone, and the statistical information relating to agriculture is therefore not as complete as could be desired, sufficient statistics are available from other sources to throw a good deal of light upon the present position of the farming industry, and to furnish abundant proof of the progress it has made during the last few years. The following figures are taken from the Census returns:—

POPULATION OF THE UNION OF SOUTH AFRICA IN THE
YEARS 1904 AND 1911.

Province.	Population, 1904.		Population, 1911.	
	European.	Other.	European.	Other.
Cape of Good Hope	579,741	1,830,063	582,377	1,982,588
Natal	97,109	1,011,645	98,114	1,095,929
Transvaal	297,277	972,674	420,562	1,265,650
Orange Free State	142,679	244,636	179,189	352,985
Total	1,116,806	4,059,018	1,276,242	4,697,152

NUMBER OF EUROPEAN FARMERS IN THE UNION OF SOUTH
AFRICA IN THE YEARS 1904 AND 1911.

Province.	1904.	1911.
Cape of Good Hope	34,490	41,558
Natal	7,075 a	5,051 b
Transvaal	20,277	28,452
Orange Free State	16,184	22,320
Total	77,926	97,381

a. Includes "Farmers' Assistants" and 201 Sugar Planters and 11 Tea Planters.
b. Includes 97 Planters.

STATEMENT SHOWING TOTAL AREA OF THE UNION OF SOUTH AFRICA AND THE AREA
UNDER IRRIGATION AND IN USE FOR AGRICULTURAL PURPOSES.

Province.	Total Area.	Under Cultivation.	Lying Fallow.	Grazing.	Under Irrigation.
	Morgen.	Morgen.	Morgen.	Morgen.	Morgen.
Cape of Good Hope	83,757,831	974,266	376,873	58,058,667	282,367
Natal	10,671,001	481,807	106,922	4,293,298	18,671
Transvaal	33,390,647	954,825	223,094	14,297,851	113,756
Orange Free State	15,236,641	872,073	185,990	13,295,422	49,308
Total.—The Union of South Africa ...	143,056,120	3,282,971	892,929	89,945,238	464,102

LIVE STOCK—COMPARATIVE SCHEDULE.

	Cattle.		Horses.		Mules.		Asses.		Ostriches.	
	1904.	1911.	1904.	1911.	1904.	1911.	1904.	1911.	1904.	1911.
Cape of Good Hope ...	1,954,390	2,715,330	255,060	333,962	64,433	47,059	100,470	191,086	357,970	728,087
Natal ...	666,903	456,087	66,574	75,567	4,450	15,602	2,418	28,018	1,523	4,111
Transvaal ...	515,956	1,399,298	51,654	89,160	43,917	25,275	32,496	106,048	14	5,441
Orange Free State ...	363,204	1,286,234	76,251	220,725	21,934	5,995	6,546	11,558	1,323	9,097
Total, Union of South Africa 1904 and 1911 ...	3,500,453	5,796,949	449,539	719,414	134,734	93,931	141,930	336,710	360,830	746,736

	Sheep.		Goats.		Pigs.		Poultry.	
	1904.	1911.	1904.	1911.	1904.	1911.	1904.	1911.
Cape of Good Hope ...	11,818,829	17,134,513	7,162,463	7,953,414	385,945	505,730	3,882,559	4,590,022
Natal ...	668,378	1,519,258	999,932	989,274	75,887	110,332	1,233,219	1,530,175
Transvaal ...	835,749	3,415,250	873,981	1,771,720	155,843	302,882	569,314	2,719,016
Orange Free State ...	2,999,547	8,587,638	734,169	1,048,571	61,409	162,656	627,363	1,694,696
Total, Union of South Africa, 1904 and 1911 ...	16,322,503	30,656,659	9,770,545	11,762,979	679,084	1,081,600	6,312,446	10,533,909

Unfortunately figures are not available for comparing the area of land cultivated in 1904 with the area cultivated in 1911, but the increase must be considerable, particularly in the Transvaal, where in 1904, the area of cultivated land was very small, and where, since the rise of the mining industry, until recently it did not produce sufficient mealies—the staple crop—for its own consumption.

The increases in the number of the various kinds of live stock are remarkable, particularly in view of the ravages of East Coast Fever amongst cattle in certain parts of the country. They are no doubt partly due to practically all animals capable of breeding being preserved, but as a set off against this, large numbers of high class animals have been imported, and more care has been taken both of them and of the native animals that require weeding out. The general standard of the live stock throughout the country is higher than it was.

A list of the principal and most important exports connected with agriculture is given in the appendix, and in the main those figures likewise show that production is increasing, and the soil is being developed.

The chief exports were maize and maize meal—£480,040, compared with £439,244 in 1911, in addition to which maize to the value of £59,802 was sent to Rhodesia last year, as against £7,241 the year before. Ostrich Feathers increased from £2,253,140 in 1911, to £2,609,638 in 1912; wool from £3,899,829 to £4,780,594; hides and skins from £1,211,527 to £1,710,014, and Angora hair from £917,874 to £967,286. The total value of produce of the land exported in 1912 amounted to £11,163,506, as against £9,246,134 in 1911, and £6,630,455 in 1908.

The imports of dairy produce increased from £799,188 to £901,777, nearly half of which was for condensed milk. There is good reason for believing, however, that this formidable sum, which is a great reproach to the Union, will soon be much reduced. The imports of corn and grain, flour and meal declined from £1,285,157 in 1911 to £1,059,126 in 1912, and of sugar from £596,042 in 1911 to £409,835 in 1912.

The imports of agricultural machinery and implements, manures and fertilizers and of pure bred animals for breeding purposes were greater than in the previous year.

Agricultural land is becoming dearer; during the last decade on an average farms have probably more than doubled in value, and in some cases more. The rise in the value of land, which on the whole seems justified from a business point of view, is to be welcomed as a sign of the prosperity of the farmers, and of confidence in the country, and as conducive to better farming and closer settlement; but on the other hand the more expensive the land the more difficult will it be for young men of limited means to establish themselves thereon.

ADULTERATION OF WINES, SPIRITS, BEER AND VINEGAR IN THE CAPE PROVINCE.

During the year 1912 under Cape Acts Nos. 42 of 1906, and 19 of 1908, 291 samples of wine, brandy, whisky and vinegar were purchased in the Cape Province, and submitted to analysis, the results are shown in the table subjoined.

Article.	No. of Samples.	Adulterated or Deficient.	Incorrectly Labelled.	Artificial or not Genuine.	Remarks.
Wine ...	95	4	5	...	S.A. Produce.
Brandy ...	97	3 (water)	6	...	"
Whisky ...	1	...	...	...	...
Vinegar ...	98	19	2	6	Mainly S.A. Produce.

With regard to the above it should be said that the year has confirmed the opinion expressed in last report that adulteration of liquors produced in the Cape cannot be regarded as widespread.

Only one sample of whisky was examined, as the examination of the various brands of the liquor is carried out by means of samples taken at the ports of entry.

The position in regard to vinegar is unsatisfactory, but the amended legislation referred to hereafter should ensure a marked change for the better. The errors in labelling were, for the most part due to misapprehension, and not to any attempt to wilfully mislead.

Imported produce as follows, viz.:—4 samples of wine, 7 of brandy, 8 of whisky, 6 of vinegar, 1 of champagne, and 1 of beer were taken by the Customs at

[U.G. 47—'13.]

the ports, and submitted for examination. 2 samples of whisky were found deficient in alcohol; all the other articles were in compliance with the Act.

By arrangement with the Department of the Interior, all the above analyses were carried out at its laboratories at Cape Town and Grahamstown.

During the year a good deal of attention was devoted to drafting the measure which passed Parliament during its recent session (Act No. 15 of 1913), providing against the adulteration of alcoholic liquors and vinegar throughout the Union. The experience gained in administering the Cape Acts was most useful in this respect.

The administration of the new Act has been vested in this Department and two of its officers have been appointed for the purpose.

ANALYSIS AND REGISTRATION OF FARM FOODS AND FERTILIZERS IN THE CAPE PROVINCE.

During 1912, 207 brands of fertilizers were registered, and 3 of Farm foods, as against 272 of the former, and 2 of the latter during the previous year.

The administration of the Act (No. 20 of 1907) was carried on as usual, and there is nothing noteworthy to report in this respect. I must again take the opportunity of urging the desirability of extending similar legislation throughout the Union, as the use of artificial fertilizer is steadily growing, as shown in the annexed statement.

		1912.		1911.	
		Quantity.	Value.	Quantity.	Value.
			£		£
Bone manures ...	...	6,990,900	14,366	5,275,982	11,656
Guano...	...	911,606	1,795	1,750,988	2,718
Phosphates ...	...	65,232,385	83,186	50,886,991	62,644
All others N.O.D.	...	12,732,905	25,164	14,984,985	25,706
Total lbs.	...	85,867,796	£124,511	72,898,946	£102,724

When these figures are compared with the import for 1907, viz.: 18,846,005 lbs., valued at £34,844, the contrast is startling, and shows that improved methods of farming are gaining ground rapidly.

The quantity of potash imported has increased enormously since the inception of the propagandist campaign referred to in last year's report, and shows signs of increasing in even greater ratio.

The almost negligible number of farm foods registered shows that but little use is made of them by stock owners.

The analytical work in connection with this matter was also performed by the Laboratories of the Department of the Interior.

AGRICULTURAL SOCIETIES: GRANTS-IN-AID.

A statement showing the total amount disbursed as grants-in-aid to Agricultural Societies and Associations and Societies for the Prevention of Cruelty to Animals in each Province is appended. Details of the grants made to each Society are given in the report of the Auditor-General. The grants were made in the same manner as last year, namely to Societies holding shows on the £ for £ principle up to £1,000 for permanent improvements, and at the rate of 5s. in the £ up to £500 on current expenditure of an approved nature; Societies not holding shows were given £ for £ up to £25 per annum; and representative Societies, such as Agricultural Unions, £ for £ up to £500.

In view of the undertakings made by the Government of the Cape Colony, prior to Union, the Government decided to pay certain outstanding claims to the amount of £1,692.

After a vast amount of labour the whole of the Agricultural Societies throughout the Union have now been placed on a uniform basis, and with the exception of two or three Societies whose claims are being considered, the whole of the Societies

have been paid up to date. Under the Financial Relations Act the Provincial Councils have the right to take over the administration of grants-in-aid of Agricultural Societies. The Cape Province has exercised this right, and the remaining Provinces are considering the matter. The increase in the amount of the grants was due to an increase in the number of Agricultural Societies, and to expenditure on permanent improvements. During the last decade the Agricultural Shows have vastly improved. Large sums of money have been spent in laying out and equipping the Show yards, which as far as the leading Societies are concerned, are now a credit to the Country, and compare very favourably with those in other parts of the world. The arrangement of the prize lists and the conduct of the shows are also good. Naturally all Societies are capable of improvement in one direction or another, and some are still far from what they should be, but on the whole the standard is good, and great credit is due to those responsible for the shows, for the immense amount of useful work they have done; and to the public for the liberal manner in which they have contributed to the finances of the Societies.

The number of exhibits is increasing, and greater attention is being paid to the preparation of live stock for exhibition, and the general standard of the animals is improving. The good ones are better and more numerous than they were, and the poor, ill-conditioned animals that used to figure so largely on many shows are rapidly disappearing. So far the bulk of the animals exhibited have been imported, but the number of animals entered as S.A. bred is increasing.

Officers of the Department have made a point of attending shows as much as possible, as they afford one of the most convenient opportunities for meeting the farmers. Members of the Department have been in great request as judges, and have attended in that capacity all the large shows, and as many of the smaller ones as they could get to. At many of the shows officers of the Department have judged or assisted to judge nearly every class. Lectures and demonstrations have been given at the Shows on the different breeds of stock, stock judging, dairying, wool sorting, fruit growing, domestic economy and so forth.

A large carefully prepared exhibit on the lines of the exhibit of the Transvaal Department, designed to interest and enlighten the farmers, and to illustrate the work of the Department, was sent to all the principal shows, and to as many of the others as could be visited. Representatives of the various Divisions of the Department accompanied the exhibit to explain their sections of it, give advice and answer questions. The exhibit was attended by a large number of people, who displayed great interest in it.

Grants were made to non-show holding Societies, such as Agricultural Unions, and so forth, as before, except that the grant to the Cape Agricultural Union was increased from £500 to £700, and to the Transvaal Agricultural Union from £500 to £600, on the £ for £ principle. The Transvaal Agricultural Union and the Transvaal Boeren Vereeniging, which at one time appeared likely to divide the farmers into two camps, happily agreed to amalgamate, and in the Cape Province there are good prospects of the Cape Agricultural Union, the Cape Farmers' Association, and the Eastern and Western Province Boards of Horticulture uniting to form one Association.

A new development has been the formation of Societies designed to promote the interest of particular breeds of live stock. Up to the present the registration of pure bred live stock has been undertaken by the South African Stud Book Association, which was formed in 1904. The function of the Stud Book Association was to register in its Stud Book animals bred from registered parents, and in certain cases to inspect animals believed to be pure bred and of sufficient merit to warrant their inclusion in the appendix of the Stud Book, with a view to the admission of their descendants to the Stud Book later on. The work performed by the Stud Book was indispensable and excellent as far as it went, but it did not, and could not, quite meet the wants which Breed Societies can supply, as such Societies can interest themselves in improving and pushing the breeds they are interested in in a manner the Stud Book could not do. Breed Societies are in existence in every country in which live stock farming is of any importance, and their formation here is a sign of the times, and indicates that the breeding of high-class pure bred stock is being keenly and systematically undertaken in the country.

The following Societies have already been formed: Ostrich, Shorthorn, Friesland, Africander, Merino, Hackney, Clydesdale.

The allocation of grants to the Judges' Associations in the Cape Province and Orange Free State, the Stud Book Association, and the Breed Societies presented a good many difficulties on account of their being so closely associated to each other,

at it is hoped that the matter has now been adjusted. In addition to assisting the Stud Book Association and the Breed Societies by grants, officers of the Department have acted as inspectors for them whenever possible.

Speaking generally it may be said that most of the different branches of the Agricultural industry are now becoming organised, and have their Societies and Associations, which like the formation of Stud Books, and Breed Societies, may be regarded as an indication of progress—accomplished and imminent.

STATEMENT OF GRANT-IN-AID OF AGRICULTURAL AND OTHER SOCIETIES.

(PAID DURING THE PERIOD FROM 1st APRIL, 1912, TO 31st MARCH, 1913.)

Agricultural, Horticultural, etc.	O.d.nary.	Pre-Union Permanent Improvements to Show Premises.	Post-Union Perman- ent Improvements to Show Premises.	Total	Societies for Prevention of Cruelty to Animals.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Cape Province ...	6,058 11 0	1,692 15 7	5,232 1 7	12,983 8 2	206 5 6
Natal Province ...	2,081 18 3		3,767 15 2	5,849 13 5	166 16 11
Transvaal Province ...	3,451 14 3		3,792 16 9	7,244 11 0	327 9 7
Orange Free State Province ...	3,629 17 4		801 15 11	4,434 13 3	
	15,222 0 10	1,692 15 7	13,597 9 5	30,512 5 10	700 12 0

NOTE.—Included in the above are the following grants to "Union" Societies, viz.:—

Ostrich Farmers' Association of South Africa £25; South African Poultry Association £69 17s. 6d.
South African Stud Book Association £380; South African Beekeepers' Association £25; South African
Agricultural Union £183 15s. 0d.

AGRICULTURAL PRESS

Increasing attention is being paid to the farming industry by the Press, and in addition to the several newspapers devoted entirely to agriculture, the daily and weekly press frequently contain articles on farming subjects which cannot fail to have an useful effect in interesting and educating the farmers.

LEGISLATION.

In 1912 the following Acts relating exclusively to Agriculture were passed by Parliament: Fencing, Irrigation and Conservation of Water, Land Bank, Land Settlement.

The Acts consolidate and simplify the legislation of the subjects with which they deal, previously in force in the various Colonies, and they also contain several useful amendments and additions to the Laws previously in force, and they will be of material assistance to the farmers in the development of the country.

The following Bills, affecting agriculture more particularly, are now before Parliament: Excise, Native Land, Dipping Tanks, further Provisions of Wine, Spirits and Vinegar, Forests.

TRANSPORT, COMMUNICATIONS AND MARKETS.

Means of transport and communications are becoming better and cheaper. The following figures taken from the Report of the General Manager of the South African Railways and Harbours, show the position as regards railways.

SOUTH AFRICAN RAILWAYS.

STATEMENT SHOWING OPEN MILEAGE 31st DECEMBER, 1910, 31st DECEMBER, 1911, AND 31st DECEMBER, 1912, RESPECTIVELY, AND MILEAGE UNDER CONSTRUCTION AND AUTHORISED AS AT 31st DECEMBER, 1912.

Province.	Open Mileage.			Under Construction as at 31.12.1912.	Authorised as at 31.12.1912.
	31.12.1910.	31.12.1911.	31.12.1912.		
Cape ...	3,329	3,397	3,492	185	306
Orange Free State ...	987	1,077	1,106	74	166
Transvaal ...	1,725	2,020	2,197	266	191
Natal ...	999	1,053	1,053	105	131
Total ...	7,040	7,547	7,848	630	794

A considerable sum of money has been spent by the Provinces in erecting bridges, and in improving roads, and the telephone system is being extended in the rural districts, but although a great advance has been made much yet remains to be done before the country is adequately provided with railways, roads and bridges, for without these agencies it is impossible for farming—other perhaps than stock breeding on a large scale—to be carried on successfully. The extension of the telephone system will help the farmers in their business, and will add greatly to the amenities of country life.

The agricultural parcel post—which varies from 3d. for parcels not exceeding $1\frac{1}{4}$ lbs. to 1s. for parcels not exceeding 11 lbs., is proving most useful.

Mail Contract:

Great benefits have been conferred upon the farmers by the new mail contract. Under it maize in bags will be conveyed to London and Southampton, and also to Antwerp and Hamburg direct in lots of not less than 160 tons for 10s. per ton of 2,000 lbs., and for an additional 3s. per ton, to many other ports in Great Britain and Ireland and the Continent of Europe. The rates for wattle bark are 13s. per ton of 40 cubic feet plus 10 per cent. primage. Fresh fruit and other products carried in the cold and cool chambers of the mail and intermediate steamers will be carried at the following rates:—

Fresh deciduous fruit, if graded by Government Inspectors, 40s. per 40 cubic feet, and if ungraded 50s. Citrus fruits and pine apples 25s. per ton. Butter and meat, under certain conditions, at $\frac{1}{2}$ d. and $\frac{3}{8}$ d. per lb. respectively, and in the case of chilled meat, at not more than the current contract rates, from the Argentine for the time being.

The rates on wool are to be reduced by 10 per cent., or if the consignment is pressed to the Australian standard by 15 per cent. Last, but not least, pure bred stallions, mares (with the exception of racehorse mares), cattle, sheep, and pigs are carried free from Great Britain, and under certain conditions, from the Continent to South Africa.

The Contract is for 10 years from the 1st October, 1912, and the benefit derived from the reduction that has been obtained in the rates will be greatly enhanced by the rate being definitely fixed for an extended period.

The rate for the conveyance of sheep and other “small animals” by rail has been reduced by one-seventh, which will bring the charges for the carriage of sheep to approximately the same as those made in Australia.

The rates on South African cement have been reduced, and reductions have also taken place in the charges at Private Sidings. Market facilities, both for produce and live stock, have been vastly improved in nearly all the large towns, and the filthy slaughter poles which used to exist on the outskirts of the towns are rapidly being replaced by up-to-date abattoirs. Not only are Central Sanitary markets and abattoirs a safeguard and convenience to consumers of meat and produce, but they enable the animals to be dealt with more humanely, and reduce the risk of spreading contagious disease by enabling it to be more quickly detected and dealt with, and reduce thefts of stock by rendering the disposal of stolen animals more difficult.

LABOUR.

The conditions obtaining in respect to Agricultural labour last year varied little from those which have prevailed of recent years.

As far as could be gathered from reports from various parts of the Union native labour was a little more plentiful last year than the year before, although in some districts it was very scarce. The rate of wages paid to natives varied greatly in different districts, but speaking generally it ranged from 10s. to 20s. per month with food, in the Cape, Orange Free State, and Natal, and to considerably more in some parts of the Transvaal.

The wages paid to natives employed on the mines and in the towns and upon the railways,—which are the great competitors of the farmers,—are still higher. The practice of obtaining a certain amount of labour from natives without payment, or for a very small payment, in return for the privilege of living on the farm and cultivating a certain amount of land and keeping a certain number of stock is still largely followed in some parts of the country. Although the system is an old established one, and commends itself to farmers who have land which is not fully occupied, it is open to many objections, and it is decreasing in the more progressive districts as land is becoming more valuable and more fully utilised by the farmers.

The Native Land Bill—should it become law, may affect native labour deeply

[U.G. 47—'13.]

in many ways, but until the Bill has been passed and has been in operation for some time it will be impossible to say how or to what extent.

Indian immigration into Natal closed in July, 1911. At the end of that month there were under indenture 25,630 men. The Protector of Indians, Natal, states "since the stoppage very few Indians have left for India (7.85 per cent. to the 30th September, 1913), no doubt induced by the higher wages and better conditions to re-indenture. They are able to save much more than formerly, and having accumulated a goodly sum will probably return to India in larger numbers. The present indications are in this direction; generally speaking their wages have increased by 50 per cent." Natives are being employed in Natal more freely than they were.

White labour is now being largely employed on the Railways, roads and other engineering works, which shows that by force of circumstances the prejudice against manual labour by white people is being broken down, and there is little doubt that white labour will be employed more generally on the land than it is at present, although the movement in that direction will probably be more gradual than it has been in the case of engineering works, as there are many more difficulties to be overcome.

The handling of a pick and shovel is work which is comparatively simple, and can be quickly learned, but to acquire a knowledge of the various kinds of farm work, and to become a good agricultural labourer, needs long apprenticeship on a well managed farm. Further, agricultural labourers do not as a rule work in gangs, and cannot be as constantly supervised as navvies can, so in addition to knowing their job they must possess the moral fibre to enable them to commence and cease work at the proper times, and to steadily pursue it in the absence of their employer or his representative, and it is the lack of this quality perhaps, more than any other, which unfits so many poor whites for becoming agricultural labourers.

The inability of many farmers to train reliable white labourers and to utilize their services to the greatest advantage are also serious obstacles to the employment of white labour. The former trouble could be got over to a certain extent by the Government providing instruction for lads in farm work, though not entirely, for although the latter can give a lad a general insight into farm work, he will need years of experience on a well managed private farm to acquire the habit of application and the manual proficiency and knowledge of farm work which is expected in a good farm labourer or foreman.

Besides accentuating the poor white problem, the disinclination of farmers generally to employ white labour is a serious hindrance to the settlement of the country. In Canada, Australia, and the United States of America able bodied young men from over sea who are willing to work, can readily obtain employment on farms at a fair wage, and lads at the agricultural colleges have no trouble in obtaining work on farms during the long summer vacation, or immediately after they leave College. The young men from overseas are thus enabled to gain a knowledge of the country, and those fresh from College, of the business side of farming, before starting to farm on their own account, or if, as often happens, they are short of funds, to save sufficient money to enable them to commence farming in a small way.

WEATHER.

A brief report on the weather during the period under review has been kindly furnished by Mr. Stewart, the Chief Meteorologist, Department of Irrigation, and is included in the appendices.

The 15 months ending the 31st March, 1913, were very unfavourable for farming, owing to drought and high temperatures. The drought extended over the greater portion of the Union, and was the severest experienced for many years. The losses in stock and crops were great, but fortunately the rains came just in time to admit of the late sowing of summer crops, and to freshen the veld; had they been delayed a little longer the results would have been disastrous in the extreme, as there was no grass, and the reserves of mealies and other food stuffs for stock were practically exhausted, so in addition to there being no crops to dispose of, there would have been no food for stock during the ensuing winter, and the losses from starvation would have been enormous.

A table giving the rainfall during the period of drought, and contrasting it with the normal and with the drought of 1897, is given in Mr. Stewart's report, and further particulars will be found in his Departmental report.

CROPS.

With the exception of the grain crops in the winter rainfall area in the South-West of the Cape Province, which were excellent, and of crops irrigated from perennial streams and springs, the crops were severely affected by the drought, and were much below the average.

The winter crops were very poor indeed, and the sowing and germination of the summer crops were so delayed as to render a good yield impossible in all but a few areas where the mealies and other summer crops are not planted until late in the season.

Reference to the grain, fruit, grape, tobacco and cotton crops will be found in the reports of the Divisions dealing with them. The sugar cane in Natal was severely affected by drought. The production of wattle bark in Natal has increased from 56,000 tons in 1911 to 60,000 tons last year, and there are large areas of young trees just coming into bearing, and as the demand for bark is not unlimited, the necessity for placing the sale of it on a better basis is pressing. The wattle growers are alive to the seriousness of the situation, and in conjunction with them enquiries are being made as to the possibility of instituting a system of grading, similar to that in vogue for grain and fruit, and of extracting the tannin from the bark.

The area of land under cultivation is extending rapidly, and the methods of cultivation are improving; there is an increasing disposition to plough the land as soon as possible after the crop has been removed, in order to ensure a good tilth for the next crop—one of the first principles of good husbandry.

Heavy horses are beginning to be used for working the soil, and so are steam ploughs and steam and oil tractors, and it is probable that before long the cultivation of land by horses and by mechanical agencies will be as common here as in other countries.

The loosening of the sub-soil by dynamite has aroused a good deal of interest, and numerous experiments have been made in dynamiting the soil for fruit trees and ordinary crops in various parts of the country, the result of which should be ascertainable next season.

The amelioration of the soil is receiving more attention than formerly, and crops are being rotated and artificial manures more freely used. Experiments are being conducted with hops in conjunction with the South African Breweries, and enquiries have been received from England for the ordinary South African six-rowd barley for malting purposes, for which it is said to be very suitable. It appears that the export of barley from certain parts of the world to England is decreasing, owing to greater local consumption, and other reasons, and that some types of barley are becoming scarce: hence the enquiry.

Both hops and malting barley are very profitable crops; the possibility of successfully growing the former here has yet to be demonstrated; but there can be no question about six-rowd barley, which is a common South African crop, and the production of it on a larger scale is well worth consideration.

Pains are being taken by progressive farmers to improve the veld by more systematic grazing, and the growth of grasses like *Paspalum* and Tall Fescue, is extending. The burning of the veld—on the whole a most pernicious practice, is gradually declining as the country becomes more closely stocked, and the farmers more enlightened. The growing of food for live stock on arable land, a thoroughly commendable practice, is becoming more common.

LIVE STOCK.

With the exception of non-woolled sheep and mules every kind of live stock is rapidly increasing in numbers.

According to the Census returns there were 3,500,453 cattle, and 16,322,503 sheep in the Union in 1904, and 5,796,949 cattle, and 30,656,659 sheep in 1911, and but for the ravages of East Coast Fever the number of cattle would have been much greater. The value of the increase must be discounted to a certain extent on account of practically all animals capable of breeding having been preserved regardless of their merits, but on the other hand large numbers of high class breeding stock have been imported from abroad, and more care has been bestowed upon the animals, and the standard of the live stock generally is much higher than it was, and is rising.

The exhibits of live stock at the leading agricultural shows have improved enormously the last few years in numbers and in quality. There was a keen demand for pure bred stock of all kinds for stud purposes, and high prices were paid both for home bred and imported animals.

The importation of Merino sheep from Australia, was continued, but the importation of live stock from Europe—with the exception of horses and donkeys—was suspended during the greater portion of the year owing to Foot and Mouth disease; since the removal of the restrictions, and the coming into force of the new mail contract, the shipments have been very large, and there is reason for thinking they will be greater next year.

As stated in the report of the Principal Veterinary Surgeon, with the exception of East Coast Fever which is diminishing—and scab, the Union was comparatively free from contagious diseases of live stock last year. Gal Lamziekte was bad in certain districts, but on the whole less trouble was experienced from the various epizootic diseases than usual.

Although the management of live stock generally leaves much to be desired, a very marked improvement has taken place in animal husbandry. A certain number of studs and flocks and herds which fortunately for the country are widely distributed, are well looked after, and the general standard of farming is better.

The practice of dipping cattle is extending, and is proving of inestimable value. The drought caused severe losses to stock farmers, but owing to the greater care which is being taken of live stock generally, the farmers withstood it better than they would have done a few years ago, but the losses sustained were, in many cases, greater than they need have been, and will serve as a warning to farmers to make better provision in the shape of water for drinking purposes, ensilage, hay and other food stuffs, against similar occurrences in the future.

Perhaps the most noticeable developments in connection with live stock have been the disposition to breed cattle especially for beef, and the interest taken in Hackneys, and the heavier breed of horses like Oldenburgs, Clydesdales, Suffolk Punches and Percherons. The farmers have always recognised the value of milk properties in a cow, but until quite recently no attempts were made to breed and feed animals specially for the butcher, the beef supply of the country was derived from cows which had ceased to be useful for breeding purposes, or oxen that had become too old and slow for draft purposes. This is now being changed, and the indications are that before long the breeding of cattle for beef will be treated as seriously as the breeding of cattle for milk. The introduction of heavy horses is also to be welcomed, both on account of their value for draft purposes, and for providing heavy mares for mule breeding, and for mating with thoroughbreds in order to obtain the general purpose horse, which plays so prominent a part in all countries. Occasionally two or three horses are now to be seen employed in ploughing or other work upon the land, and there is little doubt the use of heavy horses for farm work will become more general.

CONCLUSION.

In conclusion, it may be said that judging from such statistical and other evidence, as is available, there is good reason for regarding the position and prospects of agriculture with satisfaction.

The drought gave a severe set-back to the farmers living in the area over which it prevailed, but heavy as were the losses inflicted by it, they were not nearly as great as they would have been had it occurred a few years ago, for, under the conditions obtaining then, farmers would have been brought to the verge of ruin, if not of starvation, and the State would probably have had to assist the sufferers, whilst as it was the effects, bad as they were, fell far short of that. The reason for this was the better provision made by the farmers for obtaining and conserving water for live stock, and for irrigation, the extension of the areas of land under cultivation, the improvement of methods of cultivation and farming generally, and the growth of the practice of supplementing the veld by the produce of the arable land. The manner in which the country passed through and recovered from the ordeal to which it was subjected furnishes an excellent illustration of the merits of the country and the advance made by the farmers. There is still ample scope for further improvement, however, and if the drought impresses upon the farmers the necessity for greater care and forethought in the management of their farms, and of timely and thorough cultivation, and of not keeping more stock than they can do justice to, it may prove a blessing in disguise.

Despite the drought the progress which has been so marked of recent years was maintained, and in many directions extended and accelerated.

It is doubtful whether the position attained by the farming industry and the hopefulness of its future are fully appreciated. True, there is yet a vast amount to be done; there are still large tracts of land unoccupied, or put to little use, there are

many poor farmers, and there is much to be learned about farming in this country, and many difficulties to be overcome, but, on the whole, very substantial advances have been made. Not only has an immense amount of money and labour, far larger than is generally realized, been invested in agriculture by the farmers and by the State, but there is every likelihood of its being profitably employed, for, owing to the assistance afforded through this and other Government Departments, which cannot fail to exercise an abiding influence as it is fundamental in character, and to the influence and example of the good farmers scattered over the country, and the lessons to be learned from their successes and failures, farming is becoming much less risky and better understood than it was, and the position and prospects of the industry in South Africa are very different now to what they were a few years ago. There has been a general uplift, and it is doubtful whether, of late years, agriculture has made greater strides or farmers on the whole have been more prosperous in any part of the world than in this country.

Farms are being taken up in parts of the Union which were hitherto neglected, and in the older and more favoured districts they are being sub-divided. More land is being broken up, and more care devoted to the cultivation of the crops, live stock are increasing in numbers, and improving in quality. Farmers are busily engaged in fencing their farms, obtaining and conserving water, erecting buildings and dipping tanks for cattle and sheep, and to a lesser extent in planting trees and generally taking steps to increase the productivity of their farms and reduce the cost of working them, and everywhere one goes one sees the signs of achievement and progress, and reason for anticipating still greater advances in the near future.

I have the honour to be, Sir,

Your obedient servant,

F. B. SMITH.

Secretary for Agriculture.

APPENDIX I.

VETERINARY DIVISION.

Annual Report, 1st January, 1912—31st March, 1913.

The record of the work of the officers of this Division during the past fifteen months continues, as heretofore, to be chiefly a chronicle of our campaign against *East Coast Fever*. This disease, although not monopolising the energies of the staff to the exclusion of all work in connection with the suppression of other proclaimed diseases, has taken up so much of our time, and has necessitated the transfer of so many Veterinary Surgeons to the areas in which the disease is prevalent, that the amount of work which we have been able to carry out in other directions has necessarily been limited by the demands made on our resources by the menaces of this scourge, which now threatens to overrun the Eastern Province of the Cape Colony, in which it has already established itself, having extended thither from Native Territory.

EAST COAST FEVER—CAPE COLONY.

Early in February, 1912, an outbreak of East Coast Fever was discovered on Farm 63, Ward 3, East London District—the first to be recorded in the Cape Province proper.

How the disease was introduced is a matter of surmise, but it is believed to have originated through the movement of infected cattle from the Native District of Kentani, through the Komgha District; the cattle being presumably still in good health while traversing the latter, through which they probably travelled along the sea shores, and subsequently developed the disease after arriving in East London.

Although the outbreak on Farm 63 was the first outbreak located, there is little reason to doubt that the outbreak on Farm 30.S, Kwelegha, Ward VII, which was discovered a month later, was in all likelihood the original outbreak in this District and the centre from which infection extended, not only throughout the District of East London, but also to the adjoining District of King Williamstown; because when Farm 30.S, which is 30 miles nearer the Komgha Border than Farm 63, was visited on 16th March by Senior Veterinary Surgeon Dixon, there were fifty animals visibly sick out of a herd of two hundred, a state of affairs which could only be accounted for by the assumption that infection had existed on the farm for some months before its presence was detected.

In Ward III, owing to the fact that the infected and adjacent farms were occupied by Europeans who promptly proceeded to erect dipping tanks for their protection, the disease was checked without serious difficulty and has only extended to one farm in addition to that upon which it originally appeared; but in Ward VII the position was more difficult to deal with and the obstacles which presented themselves were greater, so that the infected area became considerably extended, invading the greater part of the lower portion of Ward VII, and mortality from the disease has been much heavier. This, in large measure, was due to the original appearance of the disease amongst cattle belonging to Natives, who probably moved animals surreptitiously before the disease was discovered; also because the residents—a mixed community of Natives and Europeans occupying small holdings with communal grazing rights—were unwilling to combine for the purpose of erecting tanks in whose efficacy they did not believe; while the Department was not in a position to enforce their erection, as many of the holdings on which the disease appeared belonged to absentee owners, to whom the existing law about the compulsory erection of dipping tanks does not apply.

The position has now, however, been improved by the erection of a dipping tank at Government expense in the common grazing ground, on which the disease originally appeared, which has now been fenced: and by the compulsory removal thereto of the cattle belonging to owners who have failed to provide themselves

with dipping facilities. There the concentrated cattle will be dipped under supervision, and after the area has become free from infection the surviving animals will then be handed back to their respective owners if circumstances will permit.

In the adjoining District of King Williamstown a centre of infection was discovered soon after the discovery of the first East London outbreak at Malalakas Location, some six miles east of King Williamstown, on the Buffalo River. This outbreak, there is a good deal of evidence to show, can be attributed to a movement of infected cattle from Farm 63 in the East London District. The conditions under which this outbreak made its appearance were, if possible, more adverse even than those obtaining in Ward VII in East London, as the Location in which the outbreak occurred is densely stocked with cattle and unfenced. Nothing but the most strenuous effort on the part of the local officials, amongst whom I must specially mention the Assistant Resident Magistrate, Mr. Gilfillan, and Government Veterinary Surgeon Nicol, has prevented the rapid extension of the disease throughout the District, but so vigorously has the disease been fought that it has only spread to three adjoining locations, and we are still hopeful of arresting its further progress by the vigorous dipping of all cattle in and around the infected area, which has now been enclosed by a fence, and in and around which the cattle have been branded to prevent any illicit movement.

Should the course of the disease be stayed the work done in the District of King Williamstown will be an object lesson to prove what can be done by hard work on the part of local officials, supplemented by a satisfactory dipping equipment; but the situation is still one of the greatest danger, as the conditions in the District of King Williamstown are comparable to those of the Transkei, and dealing with such a disease in the midst of a large native community, who are only moderately amenable to argument and are exceedingly suspicious of new-fangled ideas about dipping, is by no means an easy task.

In addition to the outbreak at Malakalakas Location, another centre of infection has established itself at Blaney, in the same District, probably through some illicit movement from East London; but there we have to deal with a European community well equipped with dipping tanks, who are tackling the disease in a businesslike way, and who should without serious difficulty be able to stamp it out.

Added to these outbreaks, another has just been reported on the Farm 144, King Williamstown District, but here again satisfactory arrangements have been made for the dipping of the animals (statistical particulars respecting these various outbreaks appear in the appendix to this report).

This completes the tale of outbreaks of East Coast Fever in the Cape Province proper, but although the position is a serious one, most of the Districts on the border of Native Territory are now fully awake to the advantages to be derived from the use of dipping tanks and their erection is proceeding apace, although there is a very regrettable apathy on the part of certain sections of the farming community in the Queenstown District regarding this very important question. Amongst these men there appears to be a tendency to look upon the warnings and recommendations of the Department as part of a scheme to convert the District into a buffer for the protection of other Districts, rather than as the outcome of a well-meant desire to persuade stockowners to learn a lesson from the misfortunes of others who turned a deaf ear to similar warnings in the past, and to take proper steps for the protection of their cattle and their own pockets against the losses which they must inevitably sustain if the disease comes upon them unawares and before they have made the necessary provision to fight it. Many seem to think it is soon enough to build tanks when the disease actually makes its appearance, forgetting entirely that its approach is often so stealthy that its presence is sometimes only recognised after it has become well established, and that before they can get a dipping tank into working order on such occasions their loss may easily exceed the cost of erecting a tank, thereby increasing their expenditure a hundred-fold; and forgetting also that the up-to-date and progressive farmer of to-day, who is the only farmer there will be room for at no distant date, knows that a dipping tank is as necessary an adjunct to successful stock farming as the plough is to the agriculturist, and even if East Coast Fever should never invade their holdings the saving of young stock effected by the use of a dipping tank speedily recoups the farmer who has put one up either with his own capital or with money which he can obtain from the Government on very reasonable terms for this purpose.

EAST COAST FEVER—TRANSVAAL.

Stockowners in the Transvaal are at last beginning to reap the harvest to which their forbearance and the support which they have accorded to the policy of the Department during the past twelve years justly entitles them, and the restrictions which have been imposed upon movements of cattle are now being gradually relaxed wherever the position appears to warrant our doing so.

Never, since the Transvaal was invaded by East Coast Fever, has the position appeared so hopeful as it is to-day, and the improvement in the situation, as might have been expected, has been most manifest in those Districts in which the co-operation of the local stockowners has been most hearty. Throughout the whole of the Transvaal there have been only twenty-five outbreaks of East Coast Fever during the past fifteen months, the District making the worst showing being that of Piet Retief, in which there have been no fewer than twelve outbreaks. This District has always been a very backward one, and is one in which more opposition has been shown to the carrying out of the Regulations than in any other District in the Province. Now, however, I am pleased to say the farmers there have begun to stir themselves, and, having at last realised what can be accomplished by the use of dipping tanks, a whole-hearted effort is being made by them to provide themselves with facilities for cleansing their stock, with the result that thirty-six tanks have been erected and are in regular use, every infected farm, with one exception, being provided with dipping facilities, the exception being a farm in the lower part of the district occupied by Natives and belonging to an absentee owner.

In every other District in the Transvaal the improvement in the position has been most marked. In Rustenburg, Waterberg and Pretoria there are now single centres of infection. In Lydenburg there are only two farms in quarantine. Middelburg District is now clean. Throughout the Transvaal no fewer than 154 farms have been taken out of quarantine. In the Zoutpansberg there are only five active centres of infection remaining in an area where there were a few years back 150 farms infected with East Coast Fever; and at the end of March, 1913, in the whole of the Transvaal there were only 54 farms left in quarantine, while on the 31st December, 1911, there were 183.

Satisfactory though the situation is as far as our conflict with the disease is concerned, the position is not devoid of danger, because a recrudescence of disease would throw the Province back where it was a few years ago, as comparatively few farmers in the Transvaal have taken the trouble to provide themselves with dipping tanks to safeguard themselves against such a contingency, although the Department has lost no opportunity of impressing upon them the necessity for doing so, and has pointed again and again to the experience of their fellow farmers in Natal.

Indications are not wanting, however, to show that interest in the dipping tank question has been awakened, and in some Districts (notably in the Zoutpansberg, in which one hundred tanks have been erected and are in use) where local officials have taken an active interest in the matter farmers are beginning to realise how valuable such tanks are and how much is to be gained by their use, and as every farmer who constructs a tank with the intention of using it, and who uses it in an intelligent manner, becomes an object lesson to his neighbours and an apostle of the gospel of dipping, I am satisfied that the next twelve months will show a notable increase in the number of tanks erected throughout the Province.

With the general disappearance of the disease in the Transvaal, the Authorities have been confronted with occasions similar in nature to others which have previously been encountered in Rhodesia, which have proved embarrassing from an administrative point of view, and which appear to indicate that the problem of East Coast Fever and the manner of its propagation has not yet been entirely solved, and that there are factors in connection with the spread of this disease which have not yet been determined. The class of outbreak to which I refer is that in which an animal dying in an area in which the disease has never been known although in close proximity to areas in which it has previously broken out and been suppressed, or in places where there are excellent reasons for believing that they have been clean for years, has presented microscopic and sometimes visible appearances of East Coast Fever. On the discovery of such cases farms have been placed in quarantine and have been kept in quarantine for the prescribed period

of fifteen months, and in some instances, although not in all, there have been no further deaths from the disease, even although the only precautions taken have been those of fencing the area and prohibiting removals therefrom. When such cases have occurred it has been customary on the part of the public to explain the anomaly by assuming that the smears upon whose examination the diagnosis is based, have been mixed at the Laboratory, and that an East Coast Fever smear taken in an infected area has been examined in place of the preparations made on the farm upon which the quarantine was subsequently imposed, and there has always been a tendency on the part of interested parties to object to the maintenance of restrictions on farms where single cases have occurred, on the assumption that there must have been an error in diagnosis. That it would be both unwise and unsafe to take this for granted, even if the precautions observed at the Laboratory to prevent such errors were less elaborate than they are, has been shown, however, by the fact that on slightly infected farms on which more than one death has occurred and on which the existence of the disease has been demonstrated to the satisfaction of the owner, intervals of many months not infrequently occur without a death taking place. In some instances the farms have undoubtedly become clean with the observance of no other precaution than that of careful herding and sometimes even without an owner taking any pains whatever to look after his animals.

Seeing this is so, and seeing it has been demonstrated conclusively that infected ticks live and retain their vitality for a period of fourteen months, the unwisdom of any premature removal of a quarantine because it incommodes an individual, or even because it inconveniences a local community, is, I think, sufficiently apparent and it has, therefore, been the invariable custom of the Department to adhere rigidly to the principle of imposing a fifteen months' quarantine in every instance in which the existence of East Coast Fever has been confirmed by microscopic examination.

The points presenting themselves for consideration and upon which light is most particularly needed are these :—

1. In cases in which the disease is discovered in uninfected areas or in areas which may be reasonably considered to have become clean, how is its appearance to be accounted for if it cannot be attributed to a movement of infected cattle ?
2. Why is it that in some cases when we detect a case of disease under conditions which appear favourable for its spread, no further deaths occur, and the area becomes clean by lapse of time ?

It may, of course, be argued that in other diseases or morbid conditions besides those set up by East Coast Fever, the microscopic bodies known as Koch's bodies, which are regarded as conclusive proof of the latter disease, may be found in the lymphatic glands and may lead to errors of diagnosis. That this may be the case is not, of course, beyond dispute, but at the present time it may be said with a good deal of emphasis that although thousands of smears from all parts of the Union have been microscopically examined at the Bacteriological Laboratory, Koch's bodies have only been found in smears coming from East Coast Fever areas, and if we assume, as we are bound to do in the light of our present knowledge, that Koch's bodies indicate the existence of East Coast Fever, how are these solitary cases to be accounted for ? The simplest hypothesis of all—if we exclude that of a movement of cattle from an infected area—is that these cases are due to the mechanical conveyance of an infected tick from such an area, either by living animals, by blankets or clothing or in wagon sails. That living animals, unsusceptible themselves to the disease convey infected ticks any great distance is, I consider, very doubtful, as the tendency on the part of these insects soon after they get on to an animal under ordinary conditions is either to bite or to loose their hold and drop off, and seeing that the extensive use of equine transport in and around infected areas has not been generally attended by that spread of infection which might reasonably have been expected if equines frequently carried pathogenic ticks for any great distance without their attaching themselves to their carrier.

Occasionally, however, I believe infected ticks are conveyed from infected areas in blankets or attached to portions of skin left adhering to meat taken from animals which have died of East Coast Fever, and only lately I heard of several outbreaks having occurred in the Mount Currie District attended by so trifling a

mortality as to warrant the presumption that they may have been due to the mechanical conveyance of stray pathogenic ticks to farms belonging to men who had been riding mealies with donkey transport through localities in Pondoland, in which the disease was prevalent, and in these instances it was alleged that the ticks had been carried to their holdings rolled up in the bucksails used by them to cover their stores and as a shelter during their journey.

This may account for some mysterious outbreaks. Others again may be accounted for by the perpetuation of veld infection by the occasional death of calves born of immune parents before veld infection has become extinct. This is most likely to happen on Town Lands or in Native Locations which were densely stocked with cattle before the first invasion of disease, and I am inclined to think to this cause many an apparently unaccountable recrudescence of the disease must be attributed. If, for instance, East Coast Fever sweeps through a small area carrying a large number of cattle, say twelve hundred head, and no steps are taken to arrest it by dipping, the disease will probably claim ninety-five per cent. of the animals inside of a few months, while the five per cent. left will be animals which have either recovered or are naturally immune. During the next fifteen months, owing to the condition of the veld which has been infected to a high degree by the death of some eleven hundred head of cattle, all susceptible calves born by the surviving immune cattle will inevitably contract the disease, and will almost inevitably die, but after the expiration of fifteen months the pathogenic ticks scattered over the area by the original eleven hundred susceptible cattle will have died out and the veld will only be infected to a very slight extent by ticks which have dropped off the susceptible calves which have succumbed during the first fifteen months, and the chances of some of the each succeeding crop of calves escaping infection will become correspondingly greater until the infection dies out entirely or until it becomes so trifling as to escape notice, as may very well happen if only a couple of calves die each year. When this comes to pass nothing may occur to attract any special attention until the susceptible progeny born of the original immune parents have increased in numbers to such an extent that their chance of picking up infected ticks is increased by reason of their increase in number or until the area is restocked with susceptible cattle on the assumption that it has become clean, and when this happens the increased mortality again attracts attention, the presence of the disease is once more discovered, and the outbreak, in all likelihood, is attributed to the reintroduction into or the movement through the area of infected stock from some locality in which the disease is known to exist.

Cases of East Coast Fever are, however, some times discovered under conditions that render it extremely improbable that the appearance of the disease is due to the mechanical conveyance of infected ticks or to movement of cattle from actively infected areas, or to the unsuspected persistence of veld infection in areas through which the disease has swept, and in some of these instances microscopic examination of blood and spleen smears has only revealed the presence of Koch's bodies in the lymphatic glands.

In some animals presenting these appearances there has been a history of prolonged indisposition and unthriftiness lasting over a period of months, and the discovery of such cases would appear to furnish some grounds for surmising that occasionally East Coast Fever may run a sub-acute or chronic course, that in these animals the specific organism of the disease being present mainly in the lymphatic glands and very rarely finding its way into the general circulation their power of infecting ticks which become attached to them is comparatively slight, although probably not always in abeyance, so that ticks attaching themselves to such animals may occasionally become pathogenic, and it is quite possible that some outbreaks may arise through the introduction into a clean area of an animal suffering from a sub-acute form of the disease. I do not intend to convey by these remarks the impression that I believe that all animals recovering from East Coast Fever retain the power of infecting ticks after they have regained their health, as I do not for a moment believe they do, but the occurrence of cases of a sub-acute or chronic type only occasionally capable of infecting ticks would account for some inexplicable outbreaks of East Coast Fever and for the absence of any subsequent mortality amongst susceptible animals grazing within the area in which such infected animals have died.

EAST COAST FEVER—NATAL.

In Natal, owing to the number of dipping tanks which have been built and are in regular use, East Coast Fever has lost many of its terrors for the stock farmer. In many areas in which the disease was formerly widely distributed it is now subsiding, while in others although not making much headway it is still smouldering. Much good has been accomplished by the refusal of the Department to permit farms which have been denuded of their cattle to be re-stocked before their owners have put their fences in good order and have erected dipping tanks, as the pressure exercised in this direction upon many backward farmers has led to the erection of tanks by many who would not otherwise have put them up. Instances do occur, however, in which such owners have observed the letter of the conditions imposed respecting restocking, but have departed from their spirit by failing to use the tanks regularly after they have been built; but even in those cases the presence of the tanks on the farms is an advantage to the community, as compulsory dipping can at once be enforced in the event of the disease making its appearance, and, meanwhile, the owner who has built a tank and failed to use it is himself penalised for his indifference by the mortality which invariably occurs amongst calves in all areas in which ticks are abundant.

In spite of the fact, however, that the mortality from East Coast Fever is being kept down in Natal by the use of dipping tanks, and although the progressive section of the farming population are sincere in their advocacy of dips, there have been 183 fresh outbreaks of the disease during the past fifteen months, and it must be apparent that some farmers at all events either do not believe in the necessity for regular dipping or their dipping operations are conducted in a perfunctory manner, otherwise the eradication of the disease would proceed more rapidly in some places than it has done. In other parts, however, the tardy disappearance of this disease can be attributed to other causes than the indifference of the farmer, and chief amongst these are the presence of Native Locations, in which the disease has established itself and in which no steps have been taken to combat the disease by the erection of tanks, and of infected farms inhabited by Natives and owned by absentee proprietors unfurnished with tanks, and with respect to which we have no legal powers to compel their owners to provide facilities for the dipping of the cattle belonging to their tenants.

Fortunately, however, the depleted condition of most infected Native Reserves now makes it possible for arrangements to be made for the cleansing of the animals which survive, and steps are now being taken throughout Natal to put up tanks for this purpose, while a legal remedy has been sought for the second difficulty to which I have directed attention, and when the new Dipping Tanks Amendment Act becomes law we will then be able to bring pressure to bear on absentee owners and compel them to erect tanks whenever this is necessary. With these two obstacles to progress removed and with due attention to the dipping of stock on infected farms, there are good reasons for hoping that better days are in store for the Natal cattle owner, and that the removal of many of the vexatious disabilities presently imposed upon the individual for the benefit of the community will become possible. Meanwhile, while this Province is slowly shaking off the fetters placed upon its development by the presence of East Coast Fever, there is a tendency in many quarters to carp at the severity of the restrictions imposed in the case of farms upon which the disease appears or re-appears.

Frequently it is said East Coast Fever has no longer any terrors to the man who dips his cattle. Why then tie him up for a period of fifteen months after the occurrence of the last case when he may, perhaps, only lose a single animal in the whole of that period; and seeing it has been demonstrated conclusively that if cattle are properly dipped every seventy hours they cannot become infected if they traverse an infected area, why should farmers who are dipping be debarred from using cattle on a road leading to a Railway Station simply because that particular road at one or more points traverses an area which is not yet clean; why not let them use the road on the condition that they dip at short intervals under penalty of losing their cattle if they don't?

Now, if we had finally abandoned all hope of eradicating the disease, and if the erection of tanks became general and if no one suffered but the individual who wants to move, something might be said for abandoning our present methods and relaxing the restrictions or even doing away with them altogether, but when we consider the strides that have been made during the past three years in the

direction of stamping out East Coast Fever, and when we remember that infected ticks may survive a fourteen months' fast and that we have not the necessary machinery to supervise the thorough dipping of animals which owners want to work over infected areas, when the continual reappearance of the disease in certain areas is of itself an indication that all are not as careful about dipping as they might be, and when we realise that making such concessions as those suggested would expose careful stockowners to the tender mercies of their more careless neighbours, by whom they would be continually re-infected and thereby sustain losses of cattle and be put to the trouble and expense of prolonged and frequent short-interval dipping, I am quite certain that many of those who clamour for the removal of existing restrictions to-day would vote whole-heartedly for their re-enforcement in six months time, and in the interval what has been accomplished with so much labour and so much self denial during the past three years would be lost and everything would have to be done over again if people did not lose patience, make up their minds to accept East Coast Fever as inevitable, and call for the entire abolition of all restrictions. Now that we have put our hand to the plough there should be no turning back, and, although we should be prepared on every occasion to lighten the restrictions in those parts of the country where farmers have shown by the success which has attended their efforts that they are doing something more than talking of the benefits of dipping, all those who have the welfare of the Province at heart should strive to support and assist the Department in the campaign against this fell disease by urging that pressure be put upon the backsliders of the community in order to bring them up to the mark, rather than to urge that the burden of a careless minority should be lightened temporarily by disregarding the existence of centres of infection, thereby exposing themselves to the risk and expense to which they must be put by the continual reinfection of their holdings by the want of due and reasonable care on the part of those who fail to dip their animals as they ought to be dipped.

Throughout Natal generally there are now a very large number of farms where no cases of East Coast Fever have occurred during the past twelve months, and if all goes well they will soon be due for removal from quarantine.

That this is the case affords further evidence of the zeal and care which Natal stockowners are prosecuting the campaign against the disease, and even in the Northern Districts, where a good deal of opposition was formerly evinced to the policy of requiring owners to provide themselves with tanks before being permitted to restock, the building of tanks is proceeding apace. That this opposition was shown was due, in large measure, to the absence of those object lessons which progressive farmers afford to their more backward neighbours but as soon as we were able to persuade a few of the more enlightened farmers to make a start those around them speedily appreciated the benefits which were to be derived from the dipping of their animals—the movement became general. One District in particular, which has made notable strides in the direction of equipping itself with tanks is the District of Vryheid, and on a recent occasion when I visited this District it was quite refreshing to observe the change which was taking place, and to hear from lips of sceptics of eighteen months ago an expression of their established conviction that dipping tanks were all that was wanted to ensure the extinction, not only of East Coast Fever, but also of many other bovine ailments as well.

During the past fifteen months some fifty dipping tanks have been erected and are in use in this District, and already we have been able to relax the restrictions on the movement of stock, and given another twelve months of public support and a vigorous endeavour to close the gaps in our defences by enforcing the construction of dipping tanks on all infected farms and locations, and by paying special attention to the dipping of the cattle therein, I think there are good grounds for predicting that rapid progress will be made in the right direction if stockowners will not allow familiarity with the disease to breed contempt for it and are not tempted to run risks which they would not be likely to face if they did not know that they had a means of combating the disease which enables them to check its ravages, with comparatively little financial loss, provided they are sufficiently careful in its use. In this direction danger undoubtedly lies. It is well enough to argue that the disease is no longer feared by the stockowner with the tank, but it ought to be respected if it is not feared, because if it is the necessity for continual vigilance and the need for a vast expenditure of time and money on the part of the individual for carrying out the thorough and systematic short-interval dipping of stock, and for the imposition of irritating restrictions upon those movements

of cattle which are so necessary for the successful prosecution of farming operations, but which have to be kept down to a minimum in areas in which infection exists, lest they lead to its spread throughout the Union, of which only a comparatively small portion is now infected, will speedily disappear, and farmers will then be able to carry out the campaign against the tick plague more deliberately and without the amount of interference with their regular work which becomes imperative with a disease like East Coast Fever on their thresholds.

EAST COAST FEVER—TRANSKEI.

Owing to the remote situation of this portion of the Cape Province from the administrative centre at Cape Town, and to the peculiarity of the local conditions obtaining therein, and the rapid manner in which East Coast Fever was spreading, it was deemed expedient when the Veterinary Division was reorganised after Union to provide for the appointment of a Senior Veterinary Surgeon, in order that the task of endeavouring to control and suppress the disease should receive due and proper attention. For this work Mr. Spreull, M.R.C.V.S., was selected, and put in charge of the Native Territories early in 1912.

As will be gathered from the details on the position in my last Annual Report, the post was no sinecure and demanded unremitting care on the part of the responsible officer in addition to the possession and exercise of both tact and administrative ability.

On account of the congested condition of the Native Territory, which is practically one continuous grazing ground heavily stocked with cattle from end to end, East Coast Fever spread slowly but steadily in spite of the efforts made to hold it in check by the Native Council, who, on the advice of the Chief Magistrate, Mr. Stanford, spent large sums on the construction of dipping tanks, and in spite of the inoculation operations carried on by the officers of this Department. A severe drought and famine added enormously to the difficulties of the situation, as the necessity for obtaining supplies of foodstuffs in many parts of the Territory made it difficult to take those precautions which would have been possible under less abnormal circumstances.

In carrying out his work Senior Veterinary Surgeon Spreull had the assistance of a staff largely made up of junior Veterinary Officers, none of whom had been very long in the country, and largely to their efforts we owe it that the position in the Territories did not become much worse than it is to-day, as the inoculation operations conducted by them, under circumstances the reverse of comfortable and calling for much strenuous physical work, rendered the extensive use of oxen for transport purposes much less dangerous than would otherwise have been the case. This work had to be carried out with the most scrupulous care; all the materials for inoculation had to be microscopically examined and afterwards combined by the Veterinary Officer in charge of the Camp; and, when it is recorded that nine Veterinary Officers, assisted by a few lay inoculators, living in tents and moving from one centre to another, have inoculated during the period now under review more than 158,000 head of cattle, of which from 35 to 60 per cent. have survived, I think we have every reason to be satisfied with the results and grateful to those by whose labours so much has been accomplished.

As Senior Veterinary Surgeon Spreull's remarks on inoculation against East Coast Fever, contained in his Annual Report for 1912, are of interest and the outcome of a very extensive experience, I think I cannot do better than quote them at length for the information of those who may be interested therein, particularly as they give an idea of the difficulties with which his staff has to contend:—

“ INOCULATION.

“ During the year 1912 East Coast Fever inoculation has been pushed forward to the very best of our ability with the small staff at my command. Early in the year the demands for it were such that they could only be met with the greatest difficulty; later, however, the demand eased off considerably owing to a number of causes, chiefest of which was the great drought which seemed to have such an inhibitory action upon tick life that the ravages of East Coast Fever were very much checked. Often it happened that where the natives were only too anxious to inoculate no suitable sick cattle could be found for vaccination purposes, or the few available ones would not be given up by their owners, compensation not-

withstanding. Later on in the drought many owners feared to inoculate owing to the extreme poverty of their cattle; even then, however, many more could have been done had sick cattle been available. The poor returns shown in December month (Table VII) were almost wholly due to the want of vaccine.

"Inoculation against East Coast Fever was this year practised in seventeen Districts, and in six Districts it has practically made an end of the raw cattle left. Nowhere has the inoculation been sought for so whole-heartedly by the Natives as in Pondoland. The Pondos seem to be a native people who understand how to 'get a move on,' and it was well for them that they did so, as their long grass veld, moist climate and want of dipping tanks have given them such a heavily tick-infested pasturage that East Coast Fever spread much more rapidly within their Districts than anywhere further inland. Inoculation came to an end in Mqanduli in February, Port St. John's in March, Ngqeleni in June, Bizana and Willowvale in August and Idutywa in October. The Districts of Lusikisiki and Flagstaff were nearly completed also by the end of the year.

"When inoculation was started infection was more or less limited to confined areas, but the months of January, February and March, and even later, saw such a rapid spread of the disease that widespread inoculation became necessary. We had begun by inoculating in or near infected centres, and tried hard to control movements for inoculation purposes, but the Natives soon took the law into their own hands, and so keen were many of them to inoculate that they would drive their cattle from many miles off to an inoculation camp, and then finding that it had been moved, follow after it, disregarding all District boundaries. Often to escape detection they would have their cattle inoculated under a false name or added to the troop of a friend of theirs. It is not surprising, therefore, that our injunctions for the after-treatment of these cattle were so far disregarded that clean cattle hung around a camp for days before treatment, grazing the while on badly-infected veld, and that when the tick test should have been undergone they were often on a clean area at their own kraals, quite reversing the conditions which we were anxious they should observe. Early in the year and on the Coast we found that a six weeks' test was quite sufficient; in autumn we increased the period to eight weeks; in winter to ten, and yet the latter, possibly owing to the extreme dryness, already commented upon, was often far from satisfactory.

"The drought, too, militated against our operations in yet another way, for, owing to poverty, many herds had to leave their lowland infected veld and seek the grassy uplands or mountain sides which were clean, many of such cattle have died recently on being returned to grass infection.

"I think we can affirm with certainty that it is better for inoculated cattle to be subjected to infection about the fourteenth day than at an earlier or a later date. Working in the loose manner which is inseparable from field conditions in a country such as this, it is very hard indeed to watch one's results and, as already explained, we have little power to control them. Cattle brought from clean to infected veld, inoculated and then left there, always did very badly (*vide* Ndwalani inoculations, see Table VIII). Many vaccines must cause only a transitory reaction and immunity, and cattle inoculated with these, if not tested from about the fourteenth day, will do badly. I know of only a very few cattle which were inoculated twice; in these cases the second inoculation caused no further mortality.

"Such was the magnitude of the work before us that I have always endeavoured to dissuade any Native who proposed to resort to a second inoculation. Not many would care to do so, perhaps, for the majority consider inoculation making the best of a bad job, but there are others whose faith is implicit enough for any test, and later, I feel sure, we shall hear that second inoculations have been tried unbeknown to us.

"It occurred to me here to read over my report, letter 367, dated 6th May, addressed to you upon the subject of inoculation. I regret to find that I have so little to add to it, that so much is still uncertain, and that our greater experience of the method has not brought about that scientific exactness and precision which is so desirable in work of this nature. We are satisfied that vaccines taken from several cattle and mixed together will give the most certain, and safest results, and that all vaccines should be used very promptly after manufacture. Best results will, therefore, be attained when large troops of cattle are to hand for inoculation and several sick cattle are destroyed for vaccine. This generally means a highly infected centre and badly infected herds, so that the one set of condition counterbalance the other.

"The present method is one which can never be practised in a civilised area, except as a means to immunise or rapidly make an end of the mortality in a location, and incidentally reduce the number of the cattle to such a handful that a subsequent short-interval dipping could be easily enforced, I see no possible reason why it should ever be given a trial in the Cape Province proper.

EAST COAST FEVER INOCULATION: PERCENTAGE TABLE (No. VIII).

"In Table VIII I have endeavoured to set forth some immunity percentages, actual or computed. The figures have been collected with every care, but they cannot, however, be regarded as absolutely correct.

"Lot 2 is the transport oxen referred to by Mr. Goodall in his report, and was evidently inoculated under ideal conditions. Lot 3 is exactly comparable, whilst Lot 4 is interesting by contrast. Here the cattle, supposed to be clean, were moved to infected veld, inoculated, and left to graze there till immunity was acquired.

"Lots 5 to 9 reflect pretty much the state of infection in these locations at the time of inoculation: Ndevu's Location had only very recently had its first outbreak, whilst Mvinjelwa's was already very badly infected.

"Lot 10 appears to be excellent, when the large number of cattle is considered, but I have reason to believe that these results will not be final, the infection during the drought largely failed to test completely.

TABLE VII.
East Coast Fever Inoculation, 1913.

District.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sep.	Oct.	Nov.	Dec.	Total.
Bizana..	5,000	2,120	3,188	—	—	1,149	1,572	761	—	—	—	—	13,790
Butterworth..	—	—	—	—	—	—	—	—	—	440	—	—	440
Engcobo..	—	—	1,724	—	—	3,131	4,898	369	256	4,317	2,852	—	17,547
Flagstaff..	—	—	—	—	2,200	8,523	—	—	2,490	—	3,400	263	16,876
Idutywa..	—	—	489	2,668	1,801	2,280	733	1,260	5,917	2,966	146	—	18,260
Kentani..	—	—	—	—	—	—	—	—	—	174	572	2,835	3,581
Libode..	318	300	659	1,037	1,211	3,338	1,675	4,248	237	—	—	—	13,023
Lusikisiki..	—	621	—	—	—	—	1,996	3,177	2,220	2,394	120	—	10,528
Mt. Ayliff..	—	—	—	—	—	—	—	—	—	—	33	—	33
Mqanduli..	2,800	1,615	23	103	245	—	—	37	—	—	—	—	4,823
Ngqeleni..	774	1,568	1,040	3,600	4,595	1,795	5	125	4	13	—	—	13,519
Nqamakwe..	—	—	—	—	—	—	—	—	16	164	—	—	180
Port St. John..	—	1,734	2,711	—	—	4	—	14	—	—	—	—	4,463
Qumbu..	—	—	—	—	—	—	—	19	69	—	—	—	88
Tabankulu..	—	—	—	—	—	—	—	—	—	3,318	607	459	4,384
Tsolo..	—	—	—	—	—	3,951	3,178	7	613	160	99	48	8,056
Umtata..	55	1,074	2,212	1,194	2,334	3,907	2,023	2,643	250	1,169	983	550	18,394
Umzimkulu..	—	200	—	—	—	—	—	—	—	—	—	—	200
Willowvale..	—	2,248	277	1,322	1,669	1,365	—	1,906	1,569	33	175	135	10,699

Grand Total 158,884

Monthly Totals ..	January	..	..	8,947	July	..	..	..	16,080
	February	..	..	11,480	August	..	..	..	14,566
	March	..	..	12,323	September	..	..	..	13,641
	April	..	..	9,924	October	..	..	..	15,148
	May	..	..	14,055	November	..	..	..	8,987
	June	..	..	29,443	December	..	..	..	4,290

TABLE VIII.
East Coast Fever: Immunity after Inoculation.

Lot No.	G.V.S.	Date of Inoculation.	No. Inoculated.	No. Immune.	Percentage Immunised.	District.
1	Goodall ..	November, 1911 to Feb., 1912.	15,503	4,074	26·27	Bizana.
2	" ..	" ..	390	4,074	75·00	"
3	Chambers ..	Nov. 1st, 1911 ..	162	126	77·7	Libode.
4	" ..	Feb., 1912 ..	549	74	13·47	Ndwalani, Port St. John.
5	" ..	" 21st, 1912	625	382	61·12	Ndevi's Loc., "
6	" ..	" 22nd, 1912	55	2 0	36·36	Diko's Loc., "
7	" ..	" 22nd and Mar. 5th, 1912.	906	326	35·98	Linting's Loc., "
8	" ..	Mar. 12th, 1912	680	59	8·67	Mvinjelwa's Loc., "
9	" ..	" 13th, 1912	197	50	25·38	Nomandi's Loc., "
10	Howie ..	March-Aug., 1912	7,000	—	57·00	Umtata.
11	Henderson ..	May & June, 1912	10,700	—	46·00	Flagstaff.

"Although inoculation has its uses and, under more favourable conditions than those existing in the Transkei, could be employed to arrest the spread of disease where dipping tanks were not immediately available, the method is one which could never be recommended for general use, and is attended by not a few disadvantages.

"In the Transkei, for instance, it has undoubtedly saved a very large number of cattle which would otherwise have perished, and has simplified the problem of re-stocking in time to come, but the immunisation of over 192,000 head of cattle (I am now referring to the total number immunised since the work began) will, undoubtedly, render the final eradication of the disease more difficult, as the progeny of immune cattle running on infected veld keep up the veld infection, and, where the immune cattle are numerous, render its eradication very difficult unless thorough dipping is carried out afterwards or unless steps are taken to kill off the susceptible progeny immediately after birth and continue to do so for a period of fifteen months, thereby giving the veld a chance to get clean; but the problem is one which can be faced at a later date, and which we will probably be able to meet by collecting the surviving cattle at convenient centres and having them dipped under supervision, a step which will become possible as the Native Council are continuing to erect tanks throughout the Territory as rapidly as their funds will permit.

"What I have said so far about the position in the Transkei applies especially to those parts exclusively, or almost exclusively, occupied by Natives, but all parts of the Territory are not in the hands of Natives, and a few remarks may be made here regarding the Districts carrying an European farming population. Mount Currie, which is almost entirely a white farming District, is now infected to some extent, but so vigorously have the residents taken up dipping—there are seventy dipping tanks in use—that although there are fifteen infected areas, in the majority of these there has only been a single case of East Coast Fever, although nearly twelve months have passed since many of the outbreaks were first reported.

"In Umzimkulu, which is part Native and part European, and in which 25,000 head of cattle died prior to the end of 1911, the European farmers are improving their position daily by the erection of tanks; but in Matatiele, which still remains clean, there are, so far, only twenty-five tanks, and many more are wanted in order to ensure the safety of the District."

Much might be said about the relative position of the various Districts in the Transkei with respect to East Coast Fever, but the Table compiled by Senior Veterinary Surgeon Spreull, and appearing in the appendix under the heading "Transkeian East Coast Fever Census," gives much statistical information in a condensed form, so that it is not necessary to enlarge any further on the subject here.

TUBERCULOSIS—CAPE PROVINCE.

Owing to the number of our officers whose time has been taken up mainly in dealing with East Coast Fever, little has been done in the Cape Province in the direction of dealing with this disease in a systematic manner, and until public interest, or rather the interest of the stock-owning community, is excited to a greater degree than it is at present, the prospect of improving our position is not good. Two factors militate very seriously against the prosecution of a vigorous anti-Tuberculosis campaign: the first of these is the lack of appreciation of the economic importance of this disease amongst stockowners, who are not specially interested in well-bred stock or in dairy-farming. Many of the former are under the impression that the question is one which affects them only remotely, as cases are rarely found except amongst well-bred animals; they also believe that the climatic conditions in South Africa are distinctly unfavourable for the dissemination of this disease. That cases of Tuberculosis are not common amongst South African bred animals, living under what may be regarded as natural conditions, is true, but this does not, in my opinion, warrant the assumption that such animals are unsusceptible, as when cases do occur amongst animals of this class those which become infected do not appear to display any more resistance to attack than others, and the comparative rarity with which cases are found is almost certainly due to non-exposure to infection rather than to any natural immunity.

As a matter of fact, arguing from analogy based upon the observation of the rapidity with which the diseases of civilisation spread and the severity of their characters when introduced amongst peoples who have not been subjected for

generations to a process of weeding out of the most susceptible, there are reasonable grounds for believing that Native-born cattle exposed to tubercular infection may be even less resistant and more susceptible to attack than animals reared in civilised countries, who are raised in surroundings in which the disease is extraordinarily prevalent, and who must in process of time tend to become less liable to infection.

The second factor which materially interferes with any work which might be carried out in the direction of eradicating the disease, is a more serious one, and this is the disinclination of stockowners who breed and keep well-bred cattle, and who know about this disease, to report to the proper authorities when they suspect its presence amongst their herds. The reason for this is not far to seek, and it lies in the indifferent provision made for the payment of compensation in cases in which animals are condemned as tubercular.

Now, as I have pointed out more than once, there are only two ways of attempting to eradicate, or even control, an insidious disease of this character—the one being to carry out a vigorous campaign against it with the aid of a large staff of officials working under conditions comparable to martial law; and the other is to enlist the interest and support of those most likely to be affected by the operations contemplated and to obtain their assistance.

I need hardly say that the first method may be set aside as impracticable, while there is little likelihood of our being able to get any co-operation from owners, when the stamping-out policy which has hitherto been in force is accompanied by the payment of compensation on such a small scale that owners whose herds happen to be largely infected with the disease are driven into insolvency.

This has proved the most serious drawback of all to the proper carrying out of measures for the suppression or checking of the spread of Tuberculosis, and it is one which some endeavour ought to be made to remove while there is yet time to tackle the disease with some hope of getting the better of it at an outlay which is not prohibitive.

Time and again the Department has endeavoured to arouse stockowners to a sense of their danger, and to induce them to come forward and have their animals tested at Government expense and by Government officers. Time and again dairy owners, first in one town and then in another, have been appealed to to co-operate, and on every occasion the result has been the same—a few owners have come forward and have had their herds tested, but in each instance with the first discovery of a serious outbreak followed by stamping-out operations on a considerable scale and serious financial loss to the unfortunate owner, enthusiasm in the campaign has waned, and no more volunteers have requested the Department to arrange for the testing of their animals.

To get over this difficulty and induce stockowners to avail themselves more largely of the assistance of the Department—although I am still inclined to believe that things have not yet gone so far that we cannot afford to stamp out and to compensate on a somewhat more liberal scale—the Regulations have recently been altered to an extent which enables officers of the Department to give owners the alternative of isolating reacting but visibly healthy animals to the satisfaction of the Department, instead of being compelled to submit to their destruction; and with this modification we are now getting more frequent opportunities of testing herds, but still the work is progressing slowly, although a good few Natal farmers have lately had their herds tested with Tuberculin, in some instances with unexpected and not altogether satisfactory results.

Much still remains to be done in the direction of awakening public interest in this very important matter, and until stockowners realise that Tuberculosis, like murder, “will out,” and the ostrich-like policy of assuming that a herd is clean because it has not been proved to be infected is a very bad one, even from a business point of view, and it would be well for every breeder to know the worst now and to be in a position to take intelligent steps under the guidance of the Department to separate infected animals from healthy ones, in order to prevent the further spread of infection, rather than to remain in ignorance while the disease is eating its way into his herd.

Meanwhile, it is very difficult for the Department with so busy a staff to do much more than it is doing at present, or to adopt the more aggressive policy of testing every herd whether there are any reasons for doing so or not, although we are still able and willing to test in cases in which an owner asks that testing should be carried out.

In the Cape Province Senior Veterinary Surgeon Dixon reports as follows :—

“The pressing necessity for taking strong measures in dealing with Tuberculosis in the Western Province has not yet been adopted by the Government. If we are to make any real progress towards eradication it will be necessary to institute a systematic testing of all dairy herds in the Cape Peninsula.

“I am satisfied that the disease is principally confined to the dairy cattle which are shedded in and around Cape Town.

“Amongst dairy cattle in the country Districts, which are kept in the open, the disease is not by any means prevalent.

“The half-measures at present in force are doing very little good towards eradication.

“Since the beginning of November we have undertaken the testing of all cattle leaving the prohibited areas. This entails a great deal of extra work, and keeps two of our Veterinary Officers fully employed.”

With these remarks I am in accord. Details of the tests carried out and the number of outbreaks dealt with in the four closed Districts of the Cape Province—the Cape, Malmesbury, Paarl and Stellenbosch—also elsewhere, will be found in the appendix with other particulars of the work done by our officers.

From the figures given it will be noted that the percentage number of reactors in the closed Districts is small, 2.35 per cent., out of 4,001 head tested, a percentage which sinks into insignificance when compared with the estimated percentage in Europe.

TUBERCULOSIS—TRANSVAAL.

In the Transvaal, during the past fifteen months, twenty-two outbreaks of Tuberculosis have been dealt with, in the course of which thirty-three infected animals were disposed of, and 168 in-contacts were tested with Tuberculin. The position in the Transvaal is, I think, also doubtful, as we have had few applications from stockowners for the testing of their animals, and most of the outbreaks located and dealt with have been those in which cases of disease have been discovered on *post mortem* by officers of the Department, or which have been reported by the Director of the Municipal Abattoir, Johannesburg, Mr. Jas. Irvine-Smith, as having been detected by his inspecting officers when examining the carcasses of animals slaughtered there. At these Abattoirs, it is interesting to note, a considerable number of cases of Tuberculosis in pigs have been brought to light (252 out of 38,838 carcasses examined). When these were first reported it was believed that the cases were due to the feeding of these animals with milk drawn from cows suffering from Tuberculosis, and steps were taken to trace them to their original owners. Our enquiries showed, however, that in almost every instance these pigs had come from Native areas in which Tuberculosis amongst cattle is unknown and where pigs are certainly not fed upon milk, and it was then assumed that the cases were probably of human origin, and the disease had been acquired by pigs as a result of their scavenging habits.

The fact that these cases were rarely cases of generalised Tuberculosis (12 generalised to 240 localised), the site of the disease being usually the post pharyngeal and submaxillary glands, strengthened the conclusion, as bovine strains of the tubercle bacillus tend to produce generalised Tuberculosis in pigs, which those of human type do not, and the matter was finally set at rest by the experiments of the Director of Veterinary Research, who reported that the cases investigated by him yielded bacilli of the human type.

TUBERCULOSIS—NATAL.

In Natal there has been more than the usual amount of interest displayed by stockowners in connection with this disease, and quite a number of farmers have approached the Department and asked us to test their animals. As a result of the tests carried out, thirty-one outbreaks have been located, 2,285 head of cattle have been tested, of which 146 gave positive reactions.

In this Province several cases of Tuberculosis were discovered amongst cows recently imported from the Cape, which had left the Cape under certificates of health granted after tests were carried out, shortly before they were found to be

infected in Natal. In some of the animals the disease was well advanced, in others it was in the early stages, and its presence may be attributed to one of three causes—the animals may have failed to react when tested because they had been fortified with Tuberculin prior to test, or because the disease had been established so long that they did not respond when inoculated, or the ear-tags inserted as an indication that animals have been tested in conformity with the requirements of the Department, may have been taken from the cows originally tested and inserted in the ears of other animals. Since the discovery of these cases a new type of ear-tag has been adopted, which it is hoped will be more difficult to remove than formerly was the case, although the original ear-tag was the best on the market at the time it was selected.

One hundred and thirty-nine cattle from overseas have been tested in Natal thirty days after arrival; of this number five gave positive reactions and were destroyed.

TUBERCULOSIS—TRANSKEI.

No cases of Tuberculosis have been reported from this District during the past fifteen months, in spite of the fact that many hundreds, if not thousands, of *post mortems* of cattle have been made by officers of the Department during that period.

TUBERCULOSIS—ORANGE FREE STATE.

Six outbreaks of this disease have been found in the Orange Free State—two cases being those of pigs detected at the local abattoir; the other four centres were found amongst imported cattle subjected to the Tuberculin test thirty days after arrival in the country. In one of these—at the Land Settlement Farm, Roodepoort—four bulls reacted and were destroyed, while in each of the other three outbreaks one reacting animal was dealt with.

Two hundred and eight imported cattle in all were tested, but no other cases were found amongst them.

ANTHRAX.

Our records give good reason for believing that this disease is becoming increasingly prevalent. This must be attributed to the indifference and carelessness displayed by many farmers in dealing with the carcasses of infected animals. Unlike Tuberculosis, the characters of Anthrax are known and generally recognised by farmers, but in spite of this the want of care displayed in handling and disposing of carcasses of animals dying of the disease excites surprise that accidents to human beings do not occur more frequently and that we do not hear more of its prevalence amongst animals. This apathy is, perhaps, more marked in those parts of the country in which the disease Gall-lamziekte is reported to be prevalent. In such localities it is customary to attribute all deaths amongst stock to this disease and to dispose of all carcasses with a sublime disregard for the public consequences, and I am satisfied in my own mind that at least some of the farms which have acquired a bad reputation on account of Gall-lamziekte, do not deserve it, and that the mortality occurring thereon is occasionally due to Anthrax; and if farmers would only take the trouble to send blood smears to the Laboratory from cases in which the cause of death is uncertain, I have not the slightest doubt that the examination of these would occasionally reveal the presence of Anthrax.

Indirectly we frequently obtain confirmatory evidence in support of this view in the statement so often made by farmers in Gall-lamziekte areas that Anthrax vaccine is a preventive of Gall-lamziekte, and we are often told in all seriousness that certain men who inoculated their stock with Anthrax vaccine after losing animals from "Gall-lamziekte" never had another case afterwards. In such cases the inference is obvious—the original disease which was arrested by the Anthrax vaccine was, without doubt, not Gall-lamziekte but Anthrax, and it is a matter for regret that farmers in these Districts avail themselves so seldom of the facilities for diagnosis offered by the Department, because although we are, at the present moment, unable to indicate any satisfactory line of treatment for Gall-lamziekte, we can advise in outbreaks of Anthrax, and some men might be able to protect themselves from heavy and serious loss if they took smears and sent them up for examination.

ANTHRAX—CAPE PROVINCE.

Senior Veterinary Surgeon Dixon comments on the prevalence of Anthrax in Griqualand West, Bechuanaland and in Native areas in the Eastern portion of the Province, and remarks that every effort is made to get stockowners to inoculate their cattle as a preventive in those Districts where the disease is believed to be enzootic, and that the more progressive farmers are now adopting this method.

During the year there have been 197 outbreaks recorded, in the course of which 518 animals have died and 15,376 in contacts have been dealt with.

ANTHRAX—TRANSVAAL.

In the Transvaal this disease is fairly prevalent in the Witwatersrand and in the Krugersdorp, Potchefstroom, Lichtenburg and Marico Districts, while sporadic cases have occurred in Waterberg, Bloemhof, Pretoria and Carolina Districts. In all cases that come under the notice of the Department, disinfection is insisted upon and preventive inoculation is now being carried out on a large scale. The area in which greatest trouble has been experienced in dealing with Anthrax has been the Witwatersrand, and this has been due to the somewhat peculiar local conditions.

In that part of the Transvaal which consists largely of small townships, large numbers of milch cows are kept by private owners, and others, which are permitted to graze over the unfenced erven during the day and are brought up in the evening for milking, and when one of these animals happens to die suddenly, whether from Anthrax or any other cause, the owner not infrequently abstains from reporting his loss to the authorities lest he be called upon to pay the sanitary fees charged for the removal of the carcase. As a consequence such carcasses are removed piecemeal by natives from neighbouring mine compounds, and when one of these animals happens to have died of Anthrax and the blood and viscera are scattered broadcast over the veld, the inevitable result is a succession of cases of Anthrax amongst the cattle grazing in the locality and occasional deaths amongst Natives from malignant pustule, and the "old subscriber" picks up his pen and writes to his newspaper to enquire what the Government Veterinary Officer has been doing and why he has not taken steps to prevent such mortality, when the harm has really been done before the Department has been advised or has had any opportunity of dealing with the outbreak.

On account of the slackness on the part of owners in reporting the loss of their animals, special warnings have been published in the local press and in the *Agricultural Journal*, directing the attention of all concerned to the dangers resulting from their want of care, and special regulations under the Stock Diseases Act, requiring owners to report all deaths occurring amongst cattle in the Witwatersrand to the Authorities, in order that timely information may reach the Department, but even when this is done unless the carcase is looked after sharply the Natives frequently carry it away; and I remember very well in one particular instance when the local Veterinary Officer went to the spot where an animal had died, in order to ascertain what it had died of, all that was left of the carcase was a portion of the hide, and from that remnant the officer obtained a smear by which he ascertained that Anthrax had been the cause of death!

The number of outbreaks recorded for the year is smaller than that of the previous year, thirty-four in 1912, as compared with sixty-eight during 1911, but I do not think this Return affords a really satisfactory index of the prevalence of the disease.

ANTHRAX—NATAL.

In Natal the number of outbreaks of Anthrax (11) reported is the same as last year, but the number of animals which have died is less. This, the Senior Veterinary Officer attributes to greater promptitude in notifying the authorities and the more timely use of Vaccine.

ANTHRAX—TRANSKEI.

In this portion of the Union 119 outbreaks have been detected, chiefly in the course of smear examinations in connection with the diagnosis of East Coast Fever,

[U.G. 47—'13.]

and I think it may be taken for granted that although Natives know this disease and recognise it that they do not, as a rule, report it, and carcasses of animals dying of Anthrax are frequently cooked and eaten, generally with the addition of certain herbs which are supposed to protect the consumer against the possible consequences of his meal. Occasionally those who cut up the carcasses or who take part in the subsequent feast succumb to the disease, but these accidents occur less frequently than might be expected.

ANTHRAX—ORANGE FREE STATE.

Senior Veterinary Surgeon Grist reports that outbreaks of this disease appear to be on the increase. During the year there have been fifteen outbreaks, seven of which occurred in the Kroonstad District. Anthrax vaccine is used to a considerable extent in order to check outbreaks.

GLANDERS.

As the present Regulations provide for the payment of compensation, both for clinical and for reacting animals, many more outbreaks of this disease are reported to the authorities than was formerly the case, and not only are they reported but they are reported more promptly, as may be inferred from the comparatively small number of reacting animals found in dealing with many outbreaks, and I am inclined to think that on the whole the disease is gradually becoming less prevalent throughout the Union, although it is not yet on the verge of extinction.

GLANDERS—CAPE PROVINCE.

Here the Senior Veterinary Surgeon does not believe that much progress has been made in stamping out the disease, which is still widely distributed, although the number of outbreaks (30) is small when the area of the Province is taken into consideration.

District No. 6, Cape Town, has still a bad reputation for this disease, cases being not infrequent amongst horses belonging to Indian hawkers and Malay cab drivers.

GLANDERS—TRANSVAAL.

In the Transvaal we can reasonably claim that the position has improved so far as Glanders is concerned, as while the number of outbreaks (40) is considerable there is a marked reduction in the number of animals which have had to be destroyed. In connection with one outbreak, in the Standerton District, one of the Departmental Native drivers, who assisted in making the postmortem on an infected animal, was unfortunate enough to cut himself, and, although the wound was promptly disinfected at the time, symptoms of the disease made their appearance later, and the unfortunate boy died shortly afterwards in hospital.

GLANDERS—NATAL.

Nine outbreaks of Glanders are recorded for the year. The position is generally satisfactory and calls for no special remark.

GLANDERS—TRANSKEI.

Cases of Glanders amongst horses belonging to Natives occur pretty frequently, and there is always a good deal of difficulty in tracing up and testing in contacts.

The most serious outbreak of the year was discovered amongst the post cart mules plying between Butterworth and Umtata. Two died before the outbreak was reported; on test one reacted and was destroyed; at the end of April two more died and fifty-six possible in contacts were then tested; two more infected animals were picked out. A later re-test of the in contacts gave negative results, and since then there has been no recurrence.

Another outbreak occurred at Tsolo, where two died and four clinically affected animals were destroyed.

The total number of outbreaks dealt with was fourteen.

GLANDERS—ORANGE FREE STATE.

Senior Veterinary Surgeon Grist is satisfied that matters in the Free State, so far as Glanders is concerned, have improved since compensation was introduced, as owners now report suspicious cases with much greater promptitude.

The most serious outbreak occurring in this Province was one at Lindley, in the course of which ten animals were destroyed (one clinical and nine reacting), while 184 in contacts were submitted to the Mallein test. The number of outbreaks dealt with was seventeen, involving the destruction of seven clinical and twenty-five reacting animals, with payment of £226 17s. 6d. in compensation.

LUNGSICKNESS.

Outbreaks of this disease for some years past have been steadily diminishing in number, and outside of the Transkei it has not occasioned any special anxiety.

LUNGSICKNESS—CAPE PROVINCE.

Here there have only been three outbreaks during the past fifteen months. Only one of these, which occurred in the King Williamstown District in a herd of 250 Native Cattle, threatened to become serious, as seven animals became infected, but the spread of infection was promptly arrested by inoculation, and there has been no further spread of the disease.

LUNGSICKNESS—TRANSVAAL.

In 1911 there were sixteen outbreaks of Lungsickness in the Transvaal, in the fifteen months ending in March 31st there have been seven, in dealing with which five animals have died or been destroyed and 749 have been inoculated.

Unfortunately in one of the latest outbreaks in the Waterberg we have been unable to inoculate through lack of material, so that the cattle are still being kept under quarantine, and the outbreak cannot be looked upon as closed.

LUNGSICKNESS—NATAL.

No cases of Lungsickness have been met with in Natal during the past fifteen months.

LUNGSICKNESS—TRANSKEI.

In this area, as well as in the other Provinces, the disease is becoming less prevalent. In 1910 there were 264 outbreaks, in 1911 there were 90, while in 1912 there have been 33 outbreaks, in dealing with which 201 infected animals have been destroyed and 1,991 in contacts inoculated. There is little doubt, however, that in the Transkei Lung Sickness has been checked to some extent at least by the ravages of East Coast Fever.

LUNGSICKNESS—ORANGE FREE STATE.

No outbreaks of Lungsickness have been reported in the Orange Free State.

EPIZOOTIC LYMPHANGITIS.

Outside of Natal this disease is now rarely met with, and there it is chiefly found on sugar plantations on the North Coast, where cases occur amongst equines owned by Indians and Arabs.

During the year some experiments have been made in the treatment of cases with somewhat encouraging results, but generally speaking the most economical procedure has undoubtedly been the destruction of the infected animals with thorough disinfection of the premises, as there appears to be little doubt that the disease is readily spread from an infected animal to its neighbours, particularly when the latter are suffering from skin abrasions, the transmitting agents probably being flies and harness.

EPIZOOTIC LYMPHANGITIS—CAPE PROVINCE.

Two outbreaks of Epizootic Lymphangitis have occurred in the Cape Province, one in the East London District and the other in the Gamtoos River area of the Humansdorp District, in both cases the infected animals were destroyed and the in contacts have been placed under observation.

EPIZOOTIC LYMPHANGITIS—TRANSVAAL.

In 1911 nineteen outbreaks were dealt with in the Transvaal and eleven animals were destroyed. During the last fifteen months there have only been three outbreaks in the course of which four infected animals were dealt with.

EPIZOOTIC LYMPHANGITIS—NATAL.

Here the position is not so satisfactory, as there have been thirty-three outbreaks, all, with one exception, in areas in which the disease has existed for some years. Government Veterinary Surgeon Harber, in whose District most of the outbreaks have occurred, is paying special attention to this disease and reports that at an early date he hopes to be able to take nearly half of the infected localities out of quarantine.

EPIZOOTIC LYMPHANGITIS—ORANGE FREE STATE.

The Orange Free State Returns also show a clean bill of health as far as this disease is concerned.

MANGE IN EQUINES.

This disease, which was extraordinarily prevalent at the close of the war is fast disappearing. Cases when they become pronounced are not readily concealed, and when detected the imposition of a quarantine till cured generally stimulates the owner to the extent of getting him to exert himself to get rid of the disease or of the infected animals if the case is too advanced or the animal is not worth treatment.

MANGE IN EQUINES—CAPE PROVINCE.

Senior Veterinary Surgeon Dixon reports that the disease has been prevalent in the Humansdorp and Albany Districts during the winter months, but that the police are paying a good deal of attention to outbreaks. In all, there have been 133 outbreaks, in dealing with which 12 animals were destroyed and 266 placed under treatment.

MANGE IN EQUINES—TRANSVAAL.

Here there have been only three outbreaks. No animals were destroyed and seven animals only were placed under treatment.

MANGE IN EQUINES—NATAL.

In Natal there have been fifteen centres of this disease, in dealing with which thirty-three animals were placed under treatment.

MANGE IN EQUINES—TRANSKEI.

Our records here are undoubtedly incomplete, but seven outbreaks were reported and attended to.

MANGE IN EQUINES—ORANGE FREE STATE.

Only two outbreaks were found in the Orange Free State.

OTHER PROCLAIMED DISEASES.

The only other proclaimed diseases of which there have been outbreaks are :—

SWINE FEVER.

Twenty outbreaks of this disease occurred in the Cape Province in the Divisions of the Cape, the Paarl, Stellenbosch and Malmesbury last winter, and, in order to prevent the spread of the disease, the movement of pigs out of these areas was prohibited except under permit; quarantine of infected farms was also enforced, and the removal of chaff, manure or litter was prohibited, and the spread of the disease has been effectually checked.

CONTAGIOUS ABORTION.

Although we are still without definite bacteriological proof of the existence of this disease, Senior Veterinary Surgeon Grist reports that nine suspicious outbreaks have been reported and investigated in the Districts of Bloemfontein, Ladybrand, Senekal, Winburg and Thaba 'Nchu, but, although smears and specimens have been forwarded to the Director of Veterinary Research at Pretoria, the specific organism has not been demonstrated. Mr. Grist states the method of irrigating the uterus and vagina and the necessity for segregation and disinfection have all been demonstrated to owners and the suspected farms are being inspected periodically by a Government Veterinary Surgeon.

TRYPANOSOMIASIS.

Senior Veterinary Surgeon Power reports the existence of Nagana (*Trypanosoma Brucei*) in Zululand, many smears from that part of the country in which *Glossina Mersitans* is found, having revealed the presence of this disease. No cases of *Trypanosoma Pecorum* have, however, been recorded during the past year, so it almost looks as if this type of infection was formerly introduced from Portuguese East Africa and has not become established in Union Territory.

NON-PROCLAIMED DISEASES.

Although the time of the officers of this Division has been so largely taken up in dealing with diseases scheduled under the Diseases of Stock Act, several have recorded their observations with respect to other diseases of economic importance.

In Natal, during the past rainy season, Horseshickness has been unusually prevalent; this has also been the case in the Transvaal and also in the Bechuanaland Protectorate and Rhodesia, and, in fact, generally throughout those parts of South Africa which are visited by this scourge.

Blue Tongue amongst sheep has also been very virulent, and cases are on record in which animals which have been inoculated against this disease this year and which sickened in consequence of the inoculation, became ill a second time when exposed to natural veld infection, a phenomenon which is, to say the least of it, unique.

HORSESICKNESS INOCULATION.

The immunisation of horses against horsesickness has passed out of the laboratory stage of the experiment and has now been put into practice on a somewhat modest scale. During the period now under review the Veterinary staff of the Transvaal have inoculated 483 horses for various owners in those parts of the Transvaal in which this disease is prevalent, with the result that 353 animals have been discharged, including 25 on hand at the beginning of the year, 60 have died and 95 remain under observation; the death rate from the operation being 12.4 per cent. If these horses pass through the present season satisfactorily I have no doubt there will be a large demand for the services of our officers next season on the part of those who wish to use horses in those parts of the country where the disease is prevalent.

RINDERPEST.

Early in March, 1912, alarming rumours about the southward spread of Rinderpest in German East Africa excited considerable uneasiness in those States and Territories which suffered so severely when the disease swept through South

[U.G. 47—'13.]

Africa in 1896, and in order to ascertain the exact state of affairs in that Territory the British South Africa Company despatched Assistant Principal Veterinary Surgeon Edmonds to Dar-es-Salaam, with the consent and approval of the German Colonial Administration, to obtain information as to the situation at first hand. This information was embodied by that officer on his return in a report, from which it appeared that the position in German East Africa was sufficiently serious to warrant further consideration, and His Excellency the High Commissioner subsequently invited the various States and Territories concerned to send representative Veterinary Officers to Bulawayo to attend a Conference for the purpose of going carefully into the whole position and submitting recommendations. The Conference, which opened on the 10th April, was attended by Veterinary delegates from the following Administrations :—British East Africa, Northern Rhodesia, Southern Rhodesia, the Belgian Congo, the Mozambique Company's Territory, Portuguese East Africa, British Bechuanaland, Nyassaland, Swaziland, Basutoland and the Union of South Africa, and, after a session of four days, during which the position was most carefully discussed in the light of the local information furnished by the various delegates, the following recommendations were submitted. These recommendations, in the opinion of the Conference, were reasonable and of such a character that the expense of giving effect to them was not likely to be either excessive or prohibitive :—

“ The members of the Veterinary Conference called together at Bulawayo at the request of His Excellency the Governor-General, desire to place on record their appreciation of the courtesy shown and the facilities afforded by the Administration of German East Africa to Assistant Chief Veterinary Surgeon Edmonds on the occasion of his recent visit to that territory, for the purpose of obtaining information regarding the spread of Rinderpest.

“ The Conference has carefully considered the report of Mr. Edmonds and, after consultation with the various Veterinary Officers whose territories are most directly concerned, is of the opinion that the danger of the disease extending southwards is such that they are warranted in making the following recommendations to the various Administrations represented at the Conference and affected by the present situation, and urge that no time be lost in giving effect thereto.

“ The recommendations regarding the supply of serum are based upon an offer of assistance by the British East Africa Administration, conveyed by its Chief Veterinary Officer, Mr. R. J. Stordy, which is as follows :—

“ In view of the danger of the spread of Rinderpest to the South African States, my Government is prepared to supply up to 250,000 (two hundred and fifty thousand) doses per annum of Anti-Rinderpest Serum at the approximate rate of one rupee per dose, providing always that susceptible cattle are available from the Western Province of Uganda, that laboratory assistance is given to the Veterinary Pathologist by the States concerned, and that the cost of production of the serum required is met in such a manner that it does not appear in the Estimates of that Protectorate.

Resolutions :

1. “ That the various Governments mentioned below establish reserves of serum of the amount indicated in this Schedule and obtain their supplies by subsidies to the Administration of British East Africa :—

Northern Rhodesia	..	..	20,000
Nyasaland	..	..	20,000
Portuguese East Africa	..	..	15,000
Mozambique Co.	..	..	10,000
Union of S.A.	..	..	40,000
Bechuanaland Protectorate	..	..	10,000
Belgian Congo	..	..	1,000

2. “ That applications for serum from the German East Africa Administration to British East Africa receive prior consideration, until such time as the former is in a position to supply its own requirements, or until the disease spreads beyond its borders.

3. "That in the event of German East Africa requiring additional Veterinary Assistance for the purpose of combating Rinderpest, the States represented at this Conference offer to assist by seconding professional officers for duty in that Territory.
4. That if Rinderpest invades any of the Territories adjoining German East Africa, the Government of the Territories more remotely concerned render them all Veterinary assistance within their power, including contributions of serum.
5. "That on account of the vital importance of the early discovery of outbreaks of Rinderpest, those States bordering on German East Africa which are insufficiently provided with Veterinary assistance, strengthen their staffs without delay, and that not less than two Veterinary Officers be stationed on the German East Africa Border between Lakes Tanganyika and Nyasa, for the purpose of watching the situation.

The Conference desires to direct special attention to the dearth of Veterinary Surgeons in the Bechuanaland Protectorate, which places that Territory at a great disadvantage and in a position of extreme danger should the disease extend further southwards.

6. "That States engaging new Veterinary Assistants or whose present Veterinary Officers are not intimately acquainted with Rinderpest, send officers to some centre where they can have the opportunity of studying the disease in its present manifestations.
7. "That the Nyasaland Administration establish a Cattle Free Belt along the German East Africa Border, similar to that which is being cleared in Northern Rhodesia, and that joint arrangements be made by those Administrations for the patrolling of the Belt, the approximate length of which is 250 miles.
8. "In all Territories in which Regulations are not in force prohibiting the unauthorised use or removal of blood, bile, or any other material liable to convey Rinderpest, such regulations be promulgated without delay.
9. "That in the event of the disease invading Northern Rhodesia in spite of the efforts made to arrest its spread and before reserves of serum have been furnished by the British East Africa Administration, immediate arrangements be made for the establishment of a serum station at some point in proximity to the Railway in Northern Rhodesia, and the Government which is in the best position to supply staff and equipment for such a station undertakes its management."

If prompt action is taken on the lines indicated in the Resolutions there is not, in my opinion, any serious grounds for apprehension, but as the disease in German East Africa is within a comparatively short distance of the interval between Lakes Tanganyika and Nyasa, and the efforts of the German authorities may fail to check its progress. Although they have a well-equipped Veterinary establishment it is, in my opinion, of the utmost importance that no time should be lost in giving effect to the recommendations of the Conference, as those who faced the 1896 invasion have not forgotten the appalling rapidity with which the disease swept southwards after it crossed the Zambesi, and if it were to cross that river again and we find ourselves without a reserve of Rinderpest serum incalculable damage must be done before we would be in a position to prepare our own.

STAFF.

The Veterinary Staff of the Union during the past fifteen months have been distributed as follows:—

Cape Province: under Senior Veterinary Surgeon Dixon.

Govt. Veterinary Surgeon	G. W. Freer, Uitenhage.
"	W. G. Pakeman, Queenstown.
"	J. H. L. Lyons, East London.
"	W. Simson, Cradock.
"	R. P. Jones, East London.
"	J. Nicol, King William's Town.
"	C. S. Elphick, Cape Town.
"	E. Fern, Cape Town.
"	A. Matthew, Elliot.
"	W. Jowett, Cape Town.
"	J. P. L. Goemans, Vryburg.

Messrs. Matthew and Jowett joined the staff in October, and Government Veterinary Surgeon Goemans in November. The number of men stationed at Cape Town is accounted for by the demands made upon the staff in connection with the testing of cattle leaving the quarantined Districts of the Cape, the Paarl, Stellenbosch and Malmesbury. While the officers at East London and King William's Town have to give practically the whole of their time to East Coast Fever work.

It will be noted that large areas of the Cape Province are at present entirely without Veterinary supervision, and, consequently, when calls come in from these areas officers have to be sent from other Districts, often at considerable expense. These long journeys naturally take time and lead to considerable delay, but this is at present unavoidable, as all the work of the Division at the moment is subordinated to the necessity of combating East Coast Fever.

Transvaal: Under Senior Veterinary Surgeon Christy, Pretoria.

Govt. Veterinary Surgeon W. G. Evans, Volksrust.

"	R. S. Garraway, Pretoria.
"	P. Conacher, Johannesburg.
"	J. G. Bush, Krugersdorp.
"	T. H. Dale, Potchefstroom.
"	H. M. Webb, Carolina.
"	J. Chalmers, Ermelo.
"	J. I. Edgar, Pietersburg.
"	G. Lee, Middelburg.
"	F. J. Dunning, Lydenburg.
"	G. C. Webster, Barberton.
"	D. B. J. McCall, Zeerust.
"	G. McCall, Nylstroom.
"	G. May, Standerton.

These officers are assisted by nine Stock Inspectors who work under their supervision and direction.

Natal: Under Senior Veterinary Surgeon Power, Maritzburg.

Govt. Veterinary Surgeon F. Hutchinson, Dundee.

"	C. Tyler, Ladysmith.
"	J. L. Webb, Mooi River.
"	A. Goule, Pietermaritzburg.
"	S. I. Johnston, Pietermaritzburg.
"	F. M. Hill, Polela.
"	A. F. Harber, Durban.
"	S. H. Ewing, Eshowe, Zululand.
"	W. G. Evans, Volksrust (in charge of Newcastle)

These officers are assisted by twenty-two Stock Inspectors and 46 Dipping Inspectors and East Coast Fever Officers.

Orange Free State: Under Senior Veterinary Surgeon Grist, Bloemfontein.

Govt. Veterinary Surgeon Hamilton, Bloemfontein.

"	Wadlow, Smithfield.
"	Clemow, Frankfort.
"	Skues, Bethlehem.
"	Joyce, Ficksburg.

Another Veterinary Officer is required. In November, 1911, we were unfortunate enough to lose the services of a most energetic and capable officer, Mr. Watson, M.R.C.V.S., who died suddenly at Fauresmith.

Transkei: Under-Senior Veterinary Surgeon Spreull, Umtata.

Govt. Veterinary Surgeon Goodall.

"	Worsley.
"	Henderson.
"	Dykins.
"	Chambers.
"	Kirkpatrick.
"	Doyle.
"	Howie.

These officers were assisted by thirty-seven Stock Inspectors.

In addition to the professional and lay assistants of the Division, whose loyalty and energy leave nothing to be desired, we are greatly indebted to those officers of the Law Department, of the Native Affairs Department and the Police with whom we have been associated in carrying out our professional duties.

Where all have been so willing to assist it is somewhat invidious to mention individuals, nevertheless I feel it would be ungracious not to acknowledge the help we have received from the Commissioner of Police, the Secretary for Native Affairs, the Chief Magistrate of the Transkei and Mr. Gilfillan, Assistant Resident Magistrate, King William's Town, who has been temporarily lent to this Department for the purpose of pushing forward the erection of dipping tanks in Native areas in the Border Districts of the Eastern Province and the dipping of cattle in Native Locations.

The Assistant Principal Veterinary Surgeon, Mr. Borthwick, and the Senior Veterinary Surgeons have rendered geoman service, and the manner in which the clerical staff of the Division, both at Headquarters and at the offices of the Senior Veterinary Surgeons, have performed their duties in a manner which reflects the greatest credit on all. At Headquarters, where the staff are under the control of Mr. R. H. Williams, Senior Clerk, the amount of correspondence has been even greater than usual, as will be realised when I state that the Veterinary Division at Pretoria during the past fifteen months have received 43,400 letters and telegrams, and sent away 43,587 letters and telegrams, in addition to despatching 40,875 cattle removal permits.

By way of supplement to this Report I append the following Returns :—

1. Outbreak Returns for the various Veterinary Districts.
2. East Coast Fever Return, Transvaal.
3. East Coast Fever Return, East London.
4. East Coast Fever Return, King Williamstown.
5. Import Return, Cape Province.
6. Cattle Tanks Return, Transkei.
7. East Coast Fever Return, Transkei.
8. Tuberculosis Return.

C. E. GRAY,

Principal Veterinary Surgeon.

CATTLE TANKS IN TRANSKEIAN TERRITORIES.

AS AT 15TH FEBRUARY, 1913.

TABLE 1.

District.	Public Native Tanks.		Private and Syndicate Tanks.				Tanks under Construction.		
	Council.	Other.	European.			Native Owned.	Council.	Other.	Total.
			Pri- vate.	Syndi- cate.	Govt. Asst.				
Bizana ..	—	12*	—	—	—	—	—	—	12
Butterworth ..	5	—	2	1	—	—	—	—	8
Elliot ..	—	—	8	—	—	—	—	3	11
Elliotdale ..	1	—	—	—	—	—	—	—	1
Engcobo ..	2	—	—	1	—	—	—	—	3
Flagstaff ..	—	2*	—	1	—	—	—	—	3
Idutywa ..	10	—	—	—	—	—	—	—	10
Kentani ..	9	—	1	—	—	—	—	—	10
Libode ..	10	—	—	1	—	—	1	—	12
Lusikisiki ..	—	2*	—	2	—	—	—	—	4
Maclear ..	—	—	12	—	—	—	—	5	17
Matatiele ..	—	2†	26	—	—	1	—	—	29
Mt. Ayloff ..	5	—	—	2	—	—	—	—	7
Mt. Currie ..	—	—	69	—	1	—	—	9	79
Mt. Fletcher ..	—	—	—	—	—	—	—	1	1
Mt. Frere ..	7	—	—	1	—	—	9	—	17
Mqanduli ..	3	—	—	—	—	—	—	—	3
Ngqeleni ..	11	—	—	—	—	—	—	—	11
Nqamakwe ..	9	—	—	2	—	—	3	—	14
Port St. John's ..	7	—	2	—	—	—	—	—	9
Qumbu ..	1	—	—	—	—	—	—	—	1
St. Mark's ..	2	—	—	—	—	—	6	—	8
Tabankulu ..	—	1*	—	—	—	—	—	—	1
Tsolo ..	1	—	3	—	—	—	—	—	4
Tsomo ..	2	—	—	—	—	—	4	—	6
Umtata ..	12	—	7	—	3	—	—	—	22
Umzimkulu ..	8	4‡	37	1§	—	2	—	—	52
Willowvale ..	1	—	—	—	—	—	—	—	1
Xalanga ..	—	—	—	—	—	—	—	—	—
Totals ..	106	23	167	12	4	3	23	18	356

In December 31st, 1911, total tanks 210.

* Special tank tax. † District Council Tanks. ‡ Half Government owned. § Partly Native owned.

EAST COAST FEVER—EAST LONDON DIVISION.

Return shewing position as regards East Coast Fever in East London Division on the 31st December, 1912.

OUTBREAKS IN WARD III. EAST LONDON.

Date outbreak quarantined.	Name of Farm or Location.	Number of Animals.					
		Before outbreak.	In- crease.	Dead.	Killed.	Alive.	Salted.
3/ 2//12 ..	Farm 63	80	6	61	—	25	10
1- 7/12 ..	Farm 64	170	27	10	24	163	—
	Totals ..	250	33	71	24	188	10

OUTBREAKS IN WARD VII, EAST LONDON.

Date outbreak quarantined.	Name of Farm or Location.	Number of Animals.					
		Before outbreak.	In- crease.	Dead.	Killed.	Alive.	Salted.
20/ 3/12 ..	Farm 30 S. Cintsa ..	329	2	240	45	46	22
29/ 3/12 ..	Paardekraal Location ..	877	25	564	91	247	28
10/ 6/12 ..	Farm 34 S. Bulugha ..	171	12	99	1	83	9
10/ 6/12 ..	Farm 29 S. „ ..	155	1	44	10	102	—
23/ 7/12 ..	v. d Kemp's Location ..	507	29	29	52	455	—
31/ 8/12 ..	Farms 16 S. and 21 S. Cefani	131	—	1	—	130	—
31/ 8/12 ..	Farm 22 S. Cefani ..	313	22	11	6	318	—
31/ 8/12 ..	Farm 23 S. „ ..	101	6	4	2	101	—
31/ 8/12 ..	Farm 24 S. „ ..	157	20	—	11	166	—
24/10/12 ..	Farm 37 S. Bulugha ..	153	—	8	—	145	—
24/10/12 ..	Farm 38 S. „ ..	124	5	15	3	111	—
24/10/12 ..	Farm 39 S. „ ..	96	—	1	—	95	—
24/10/12 ..	Farm 40 S. „ ..	196	7	3	1	199	—
10/12/12 ..	Lilyfontein Sections ..	602	22	7	9	608	—
	Totals ..	3,912	151	1,026	231	2,806	59

EAST COAST FEVER—KING WILLIAMSTOWN DIVISION.

Return shewing the position as regards East Coast Fever in King Williamstown Division on 31st Dec., 1912

Date outbreak quarantined.	Name of Farm or Location.	Number of Animals.					
		Before outbreak.	In- crease.	Dead.	Killed.	Alive.	Salted.
15/2/12 ..	Mlakalaka's Location ..	355	66	81	23	317	2
23/9/12 ..	Putu's Location ..	510	30	26	11	503	3
8 10 12 ..	Faku's Location ..	569	9	25	7	546	—
30/12/12..	Ntantiso's Location ..	1,225	—	2	—	1,223	—
	Totals ..	2,659	105	134	41	2,589	5

RETURN OF LIVESTOCK IMPORTED FROM OVERSEA INTO THE CAPE PROVINCE THROUGH
THE PORTS OF CAPE TOWN, EAST LONDON AND PORT ELIZABETH, DURING 1912.

Month.	Horses.	Mules.	Donkeys.	Cattle.	Sheep.	Goats.	Pigs.	Dogs.	Cats.	Ostriches.	Various.	Monthly Totals for 1912
January ..	38	50	2	—	—	—	—	7	2	—	—	99
February ..	15	—	—	—	—	—	—	25	—	—	25	65
March ..	112	901	—	—	6	—	—	4	—	—	2	1 025
April ..	89	733	2	42	—	—	—	25	1	—	3	895
May ..	6	51	—	81	—	1	8	13	—	141	10	311
June ..	19	49	4	32	—	—	—	14	—	—	—	118
July ..	8	48	8	69	—	—	4	2	—	—	7	116
August ..	21	579	15	9	—	—	—	3	—	—	1	628
September ..	22	75	—	—	—	—	—	16	4	—	—	117
October ..	6	—	4	64	5	—	—	9	2	—	7	97
November ..	54	80	16	3	47	—	3	27	4	—	4	238
December ..	31	122	21	4	—	—	—	7	1	—	—	186
Cape Town ..	421	2,688	72	304	58	1	15	152	14	141	59	3,925
East London ..	29	—	22	18	402	—	13	17	—	—	—	501
Port Elizabeth ..	15	20	7	72	213	—	—	7	2	—	2	338
Totals for 1912	465	2,708	101	394	673	1	28	176	16	141	61	4,764

EAST COAST FEVER CENSUS.

TABLE No. VI.

District.	No. of Locations and Farms Quarantined as at Dec. 31st, 1911.	No. of Locations and Farms Quarantined as at Dec. 31st, 1912.	Date of First Outbreak.	No. of Cattle alive on Dec. 31st, 1911.	No. of Cattle alive on Dec. 31st, 1912.	Losses prior to Dec. 31st, 1911.	Losses during 1912.	Naturally Immuned or recovered.	Inoculated by Govt. Method up to Dec. 31st, 1912.	Immuned after inoculation Govt. Method.	No. of raw Cattle still left.
Bizana	15	W	16/ 3/11	65,000	9,000	16,000	56,000	3,500	22,173	5,000	500
Butterworth	1	W	12/ 12/11	23,000	19,800 (b)	1	62	"	440	150	19,500
Elliotdale	W	W	Feb., 1910	3,300	1,750	56,650	1,550	1,750	"	"	"
Engcobo	3	34	30/ 6/11	57,800	39,800	400	18,000	300	17,798	5,000	34,500
Flagstaff	W	W	26/ 2/12	47,600	12,600	"	35,000	600	16,876	7,000	5,000
Idutywa	4	28	28/ 9/11	34,200	10,700	750	23,500	200	18,260	6,000	4,500
Kentani	1	5	30/12/11	31,500	30,000	25	1,511	170	3,581	250(a)	26,634
Libode	3	26	10/10/11	54,700	26,700	300	28,000	200	13,185	3,500	23,000
Lusikisiki	W	W	13/ 1/12	76,000	26,000	"	50,000	2,000	10,528	4,000	20,000
Mount Ayliff	"	17	15/ 2/12	33,000	32,500	"	573	1	"	"	32,500
Mount Currie	"	5	17/ 4/12	50,000	50,000	"	37	2	"	"	50,000
Mount Frere	"	7	22/ 2/12	48,500	48,000	"	546	65	"	"	48,000
Mqanduli	W	W	Nov., 1910	30,000	4,000	30,000	26,000	2,500	4,823	1,500	100
Nqgelani	20	W	29/ 6/11	51,500	6,000	3,000	42,500	500	13,839	5,400	40,000
Nqamakwe	W	3	27/ 5/12	40,000	40,000	"	71	"	180	60	40,000
Port St. John's	9	W	26/ 7/11	10,000	2,600	2,300	7,400	800	5,469	1,200	600
Qunuba	1	3	8/ 8/11	40,000	40,000	1	59	"	88	30	40,000
St. Mark's	"	1	5/10/12	50,000	50,000	"	36	"	"	"	50,000
Talankulu	12	12	22/ 3/12	41,000	39,000	"	2,000	10	4,384	2,500	36,500
Tsolo	5	36	27/ 7/11	37,500	29,600	600	7,500	4,100	9,005	3,500	25,000
Umtata	13	W	23/ 3/11	51,000	15,500	2,000	35,500	1,500	19,615	8,000	6,000
Umzimkulu	104	117	31/ 3/10	33,650	17,500	25,000	16,150	1,000	795	250	16,250
Willowvale	16	W	Dec., 1910	23,200	11,200	10,000	12,000	700	10,039	3,500	7,000

W Whole district considered as infected.

(a) The Kentani cattle were nearly all inoculated in December.

(b) Butterworth has exported 3,000 beef carcasses in 1912.

TRANSVAAL—EAST COAST FEVER—1912.

JANUARY 1ST, 1912, to MARCH 31ST, 1913.

District.	Farms in Quarantine, 31/12/11.	No. of Farms placed under Quarantine.	No. of Farms released from Quarantine.	No. of Farms in Quarantine, 31/3/13.	No. of Farms cleansed of stock by means of slaughter.	No. of Stock slaughtered.	No. of Farms fenced under East Coast Fever Ordinance.	No. of Tanks. erected
Barberton ..	19	1	14	6	Nil	Nil	Nil	42
Carolina ..	12	2	8	6	1	53.	1	3
Lydenburg ..	29	2	29	2	Nil	Nil	3	4
Marico ..	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Middelburg ..	6	Nil	6	Nil	Nil	Nil	Nil	Nil
Piet Retief ..	29	12	14	27	Nil	Calves slaughtered on certain 5 farms	2	35
Rustenburg ..	25	1	25	1	Nil	Nil	Nil	1
Wakkerstroom ..	Nil	Nil	Nil	Nil	Nil	Nil	Nil	4
Waterberg ..	14	1	14	1	Nil	Nil	1	18
Zoutpansberg ..	48	5	43	10	Nil	Nil	Nil	100
Pretoria ..	1	1	1	1	Nil	Nil	1	Nil
Farms on which inoculation carried out.								
			On Farm, 31/12/11.	Inoculated.		Died.	On Farm, 31/3/13.	
Kalklaagte (Zoutpansberg) ..			133	291		158	38	

OUTBREAKS OF CONTAGIOUS DISEASES DURING FIFTEEN MONTHS ENDED 31ST
MARCH, 1913.

	Transvaal.	Cape.	Natal.	O.F.S.	Transkei.
<i>Glanders.</i>					
Outbreaks	40	35	17	18	16
Died or Destroyed ..	72	79	35	75	26
Contacts Malleined	245	460	163	1,076	220
<i>Epizootic Lymphangitis.</i>					
Outbreaks	3	5	35	..	..
Died or Destroyed..	3	5	57	..	..
Sick Animals treated	1	..	175	..	..
<i>Lungsickness.</i>					
Outbreaks	7	3	..	..	37
Died or Destroyed..	5	11	..	..	201
Contacts Inoculated	749	398	..	..	1,991
<i>Tuberculosis.</i>					
Outbreaks	22	..	..	1	..
Died or Destroyed..	33	156	208	2	..
Contacts tested ..	168	5,006	2,704	327	..
<i>Anthrax.</i>					
Outbreaks	104	231	13	17	147
Died or Destroyed..	225	613	53	..	229
Contacts dealt with..	11,851	19,027	190	..	345
<i>Mange.</i>					
Outbreaks	3	134	17	2	9
Died or Destroyed..	..	12	..	..	8
Sick Animals treated	7	267	33	..	..
<i>Trypanozoonosis.</i>					
Outbreaks .. ..	..	..	1	..	..
<i>East Coast Fever.</i>					
Outbreaks	25	29	213	..	455

TUBERCULOSIS.

RETURN OF IMPORTED CATTLE TESTED FROM 1ST JANUARY, 1912, TO 31ST MARCH,
1913.

Province.	No. Tested.	No. of Reactors Condemned.
Transvaal	68	3
O.F.S... ..	225	6
Cape	111	3
Natal	153	7
Total for Union ..	557	19

RETURN SHOWING NUMBER OF CATTLE TESTED WITH TUBERCULIN AND NUMBER WHICH REACTED TO THE TEST AND WERE CONDEMNED DURING THE PERIOD 1ST JANUARY, 1912, TO 31ST MARCH, 1913.

District.	No. Tested.	No. Reacted and Condemned.
CAPE PROVINCE.		
Cape	2,955	112
Malmesbury	787	3
Paarl	417	11
Stellenbosch	819	17
Beaufort West	6	Nil
Colesberg	10	1
Kimberley	2	Nil
Middelburg	68	6 Grootfontein School of Agriculture
Port Elizabeth	28	13
Sehloombie	125	7
TRANSVAAL.		
Ermelo	31	Nil Govt. Sheep Farm
Ermelo	6	Nil
Witwatersrand	59	5
Barberton	6	Nil
Krugersdorp	109	21
Rustenburg	20	Nil
Pretoria	51	13
Wakkerstroom	45	Nil
Middelburg	54	1
Potchefstroom	383	43 Govt. Exp. Farm
Potchefstroom	13	Nil
Standerton	165	4 Govt. Stud Farm
Standerton	159	29
Heidelberg	36	1
ORANGE FREE STATE.		
Bethulie	6	Nil
Harrismith	6	Nil
Senekal	15	Nil
Winburg	8	Nil
Heilbron	24	Nil
Lindley	7	Nil
Fredefort	174	3
Govt. Farm, Tweespruit ..	124	2
„ Roodepoort ..	103	Nil
„ Grootvlei ..	74	Nil
„ The Glen ..	26	Nil
NATAL.		
Pietermaritzburg	579	23
Ixopo	671	89
Richmond	928	100
Lions River	210	1
Estcourt	278	3
Umvoti	81	2
Durban	108	21
Newcastle	12	..
Camperdown	193	20
Total for Union ..	9,981	551

APPENDIX II.

ANNUAL REPORT, 1912: SHEEP DIVISION.

The Secretary for Agriculture,

Pretoria.

In presenting this report of the work performed by the Division of Sheep during the fifteen months ended 31st March, 1913, it has been deemed advisable to divide it into three sections, the one dealing with the eradication of scab, another with the improvement of sheep wool, and the third with the Stud Sheep Farm at Ermelo.

In the report for the period ended 31st December, 1911, were given the reasons for the establishment of the Division and the reports of the Officers (now employed by it) formerly controlled by the Veterinary and Sheep and Wool Divisions.

During the period under review, the following additional functions have been assumed by this Division:

- (a) Control of the Stud Sheep Farm at Ermelo; and
- (b) Advisory control of all flocks on the Government Experimental Farms.

SCAB ERADICATION.

The first important work which had to be undertaken shortly after the establishment of the Division was, as far as possible, to co-ordinate the various staffs and to bring about uniformity of method in the administration of the Stock Diseases Act, so far as scab is concerned, and in the steps to be taken for the improvement of the Sheep and Wool Industry.

This was by no means an easy task, for it required not only a great deal of thought to select, out of a number of possible systems, an economical and efficient one for the proper control of the work carried out by the Officers employed in the Division (particularly those administering the Stock Diseases Act and Scab Regulations), but also a large amount of labour to prepare instructions and forms for the guidance and use of the officers concerned.

ADMINISTRATIVE CONTROL.

So far as the administration of the Scab Regulations is concerned, the following system has been selected, *viz.*, each of the Districts in the four Provinces of the Union has been divided into one or more areas in accordance with its size and the number of flocks of sheep and goats kept in it, and in charge of each a Sheep Inspector has been appointed. In all three hundred and seventy-three posts have been created, to which three hundred and seventy-three Inspectors and Field-Cornets have been appointed.

These areas have been grouped into twenty-four larger areas with a Senior Sheep Inspector in charge of each one. It is the duty of the Senior Sheep Inspector to supervise the field and office work performed by the Sheep Inspectors in the areas controlled by him, to investigate complaints, to give advice and explain the Regulations when required, and to carry out such other duties as may from time to time be assigned to him.

The system of checking the field work of the Inspectors is similar to that which was in force in the Cape Province prior to Union, and is an excellent one, in that it not only keeps the Inspectors up to the mark, but also enables the Division to ascertain the qualifications of the Inspectors and the manner in which their duties are being performed, besides keeping the Department in touch with the public.

In the appendix will be found a statement (No. 1) giving a description of the several groups into which the Union has been divided, with the name of the Senior Inspector in charge, the number of Inspectors, the area of territory in *square miles*, and the total number of flocks as well as the total number of sheep and goats under the control of each officer.

The areas in the Transvaal, instead of being controlled by Inspectors, as is the case in the other Provinces, are worked by Field Cornets, who were appointed under the Transvaal Field Cornets Act (No. 34 of 1907) for a period of three years. On the expiration of the contracts of the Field Cornets in May, 1914, it is proposed to discontinue this system and to appoint whole time sheep inspectors, which course will bring about uniformity throughout the Union.

RAILWAY AND ITINERANT INSPECTORS.

In addition to the local Inspectors, it has been thought advisable to appoint, permanently ten Railway Inspectors to examine stock moved by rail and a number of temporary Itinerant Inspectors during the trek season in those districts in which trekking for change of pasture is regularly indulged in, with a view of putting a stop to movements of infected animals which are continually taking place.

The duties of the Railway Inspectors are to travel to and fro on the sections of the railways to which they have been appointed and to examine all small stock before loading takes place, whilst those of the Itinerant Inspectors are to assist the local Inspectors in examining stock passing through their areas, and to supervise the ports of entry on the Swaziland and Natal borders.

These officers are doing good work, and their appointments will undoubtedly assist in preventing movement of infected stock.

APPOINTMENTS.

Considerable difficulty is being experienced in getting suitable and competent Inspectors. Up to the present over eight hundred applications have been received, but on submitting the applicants to a field as well as a theoretical test in order to ascertain their qualifications very few have been found sufficiently competent to warrant their appointment. Some of the candidates who failed in the field test are men who had been engaged in sheep farming practically all their lives, and who were most indignant when they were requested to undergo an examination. These examinations, most of which were held at the Johannesburg Abattoirs, on account of the excellent facilities available there for the purpose, conclusively prove that a very large number of our farmers have no knowledge, or but a limited one, of the disease and its treatment, and that it is most desirable to submit even those who have passed the examination to a short course of training in dipping and microscopical examination. A large amount of time was spent by the Senior Inspectors in the examination of candidates, and this greatly interfered with their other duties.

LEGISLATION.

Uniformity of action has been made possible by the enactment of the Stock Diseases Act, 1911. Shortly after the formation of the Division, a conference of Senior Sheep Inspectors was held at Pretoria, to discuss the methods to be adopted in the campaign against scab, and to revise the Scab Regulations. The immediate result of this conference was the publication (under Government Notice No. 47 of 1912) of the Regulations at present in force. The Minister's order regarding the necessity for reporting outbreaks of scab (published under Government Notice No. 1,748 of 1911) was amended by Government Notice No. 2,107 of 1911, and again by Government Notice No. 370 of 1913, which is still in force.

The experience gained during the preceding fifteen months went to show that the further amendment of the scab regulations was an urgent necessity, and a second conference of Senior Sheep Inspectors was held at Cape Town on the 4th February, 1913. The proposed amended regulations as advised at that conference are at present with the Minister for his consideration. With the additional powers provided for therein it should be possible for more effective steps to be taken when they are promulgated.

MOVEMENTS OF STOCK.

No effort has been spared to prevent movements of infected stock. In order to discourage such movements as were not absolutely essential, the Inspectors were forbidden to issue any permits for the removal of infected stock (other than in cases where the disease broke out *en route* in the case of travelling stock), without special sanction from headquarters.

The issue of permits on the conditions set forth in Section 10 of the Regulations was allowed without special authority from Pretoria. It is considered that the action taken has been thoroughly justified by results.

The only exception made was in the case of the North-Western Districts of the Cape Province (Namaqualand, Van Rhynsdorp, Clanwilliam, Calvinia, Fraserburg, Sutherland and Carnarvon) where the local conditions, owing to the continuance of drought, were such that some relaxation became necessary. In order that no hardship might be imposed on farmers in those districts, the Minister gave instructions that permits for the removal of infected stock for grazing purposes should be granted on request, and that where dipping of the whole flock prior to removal was not feasible, visibly infected animals only should be dipped from day to day as the disease became apparent until such time as conditions improved. Unfortunately a large number of the farmers in the districts in question deliberately moved their infected animals without even taking the trouble of dipping the visibly infected ones or in any other way complying with the conditions of the concessions granted. Those who were caught in the act were prosecuted, but it is regretted to state that the fines imposed in the majority of cases were such as to encourage such contraventions rather than to act as deterrents. In many cases the fines only amounted to 10s. or £1.

The matter was at once represented to the Minister, and the following proposal was submitted for and obtained his approval. A drought zone was established, including the districts referred to, within which farmers could obtain permits for the removal of infected stock on dipping visibly infected animals from day to day, *provided* that no such movement of infected stock to any place outside the drought zone was to be allowed.

As an instance of the damage done by the first concession, it may be stated that undipped infected stock was found in the Britstown and Philipstown Districts. These flocks, however, were immediately dipped under the supervision of the local inspectors, and the evil was neutralised. The drought zone was finally abolished by the Minister on the 27th November, 1912.

Whilst on this subject, it is desired to point out that there are cases in which the refusal of permission to remove infected animals would be wanton cruelty and, therefore, in order to deal with these, the following rules have been laid down, and permits for the removal of infected stock are granted only in accordance herewith:—

- (1) Permits for the removal of infected stock are only granted in cases where grass or water has failed.
- (2) The stock must be dipped for a first time under the supervision of an inspector, and again within from ten to fourteen days of the date of the first dipping before removal. In cases where the stock is too poor in condition to be dipped without loss, all visibly infected animals must be dipped by the Inspector before removal, and thereafter all animals becoming visibly infected must be dipped from day to day until the sheep arrive at their destination.
- (3) Permits are granted only in cases where the owner can nominate as his destination some farm where the sheep can remain until they are cleansed.

Of course the decision as to whether or not stock is fit to be dipped rests with the Inspector.

There is no doubt that the spread of the disease is largely due to the movements of infected animals which are continually taking place, notwithstanding the efforts made by the Inspectors to detect and stop them.

To illustrate to what extent these movements have taken place in the past, it is desired to draw attention to the following figures in regard to the movement of slaughter stock to the Johannesburg market:—

During 1911-12, 717,547 sheep and goats were received, at Johannesburg, of which 81,891, or 11·4 per cent., were quarantined.

In 1912-13, 801,080 sheep and goats were received, and the number of quarantined animals amounted to 78,270, or 9·7 per cent.

This state of affairs, although showing an improvement during 1912-13 as against 1911-12 to the extent of almost 2 per cent, is, nevertheless, most unsatisfactory and clearly indicates that the penalties provided for offenders against

the Act are inadequate, and the penalties imposed by a large number of magistrates in the Union are still more so. In order to put a stop to these movements of infected animals the Railway and Itinerant Inspectors previously referred to were appointed in different parts of the Union. It is, however, felt that, unless heavier penalties are provided, the efforts of the Division will be negatived to a large extent.

As a means of stopping movements of infected animals, suggestions have frequently been made that no sheep be allowed to move unless accompanied by a permit from an Inspector, which permit should only be issued when the sheep are found on inspection to be free from scab. Such a system was tried previous to Union in respect of Inter-Colonial movements, and proved a complete failure, and a most irritating restriction on the owner who keeps his flocks clean. It was a failure in that the movements of infected animals were not checked in the least, and that it was impossible to take legal proceedings after a permit had once been issued. It will naturally be said that an Inspector who issued a permit for infected stock was either a rogue or an incompetent person. It is possible that some permits were dishonestly given, and others on account of the incompetency of the Inspectors, but it is firmly believed that in the majority of cases it was not possible for the Inspector to detect scab in flocks from which the visibly infected animals had been removed, and consequently he was obliged to issue a permit for sheep which required but a day or two to develop visible scab.

The delay which would be incurred in waiting for the Inspector to come and inspect the sheep before issuing the required permit would be so great that there would be a public outcry, and the Government would be compelled either to withdraw the restriction or appoint double the number of Inspectors at present engaged.

Under existing regulations any owner (other than those in native areas) may move his sheep wherever he wishes, without a permit provided they are free from disease. If they are infected with scab, they may not be moved until after they have been cleansed in accordance with the regulations or on the authority of a permit which is only issued, as previously stated, in cases where grass or water fails. If an owner moves infected animals without permission he is liable to prosecution. The object of this system is to leave the responsibility for the cleanliness of his flock on the owner who, it is thought, should at all times know whether or not his sheep are affected with scab.

A large number of movements of infected stock to Johannesburg and other large markets are no doubt due to the difficulty which is very often experienced in detecting, with the naked eye, scab on Afrikaner or other hairy sheep. The only effective and reliable way of examining Afrikaner sheep is to kraal them and examine them closely with the hand as well as with the eye, before permitting them to be moved. On account of the invisibility of scab on hairy sheep, they are frequently regarded, even by experienced farmers as clean when they are actually badly infected. This will probably account for the large amount of infection in the North-Western Districts of the Cape Province, where the flocks, which consist chiefly of Afrikanders, Persians and Bastards, are very seldom handled. Thorough dipping before the animals are moved appears to be the only way by which movements of such infected sheep can be minimised.

It is suggested, as a further means of preventing infection being spread by the movement of apparently clean flocks that all districts free or approximately free from scab be proclaimed as clean or approved districts into which no sheep whatsoever shall be permitted to enter from areas not so proclaimed without first being dipped on the border, under the supervision of an Inspector from the clean district into which the stock is being moved, and that any owner failing to dip on the border be prosecuted and his stock quarantined until they have been twice dipped. Immediately a district has been declared clean, an endeavour should be made, by giving the Inspector greater powers, to cleanse the adjoining districts, with a view to enlarging the clean areas and decreasing the infected ones. By this means it will be possible gradually to increase the number of clean districts, and when only a few infected districts remain a final effort (with the assistance of all the sheep inspectors from clean areas who can be spared) can be made to eradicate the disease from the Union.

In support of the above proposal Senior Sheep Inspector Cronwright reports that fifty per cent. of the outbreaks of scab in the areas under his control can be traced to introductions from other districts. This system, it is thought, would not cost the country more money than the amount at present expended, and would enable the Department to make much greater progress than that now

being made, and to prevent districts being reinfected by introductions such as being made, and to prevent districts becoming reinfected by introductions such as are complained of by Senior Sheep Inspector Cronwright. Of course, it is to be expected that administrative difficulties would arise, particularly at the commencement, but such difficulties should not be impossible to solve. Movements from all clean districts should be permitted, into any area, without any restrictions whatsoever.

INTRODUCTIONS OF SMALL STOCK.

In order to prevent the spread of scab from Basutoland, ports of entry have been proclaimed on the border, and no sheep or goats may enter the Union except through these ports. Dipping tanks have been constructed on the Basutoland side, and all flocks entering from thence must be twice dipped under the supervision of a Union Inspector (with an interval of from ten to fourteen days between the first and second dippings) before a permit is issued for them to proceed.

On the representations of this Division, the Swaziland Authorities were good enough to suspend their regulation requiring the dipping of all sheep or goats entering that territory, on condition that flocks entered by certain fixed routes and were found on inspection to be free from scab; on the other hand small stock, free from scab, is allowed to enter the Union from Swaziland without restriction. By this *modus vivendi* the difficulties of the Highveld farmers in the Transvaal have been greatly reduced. In one or two instances during the period under review farmers were not careful to see that their flocks were free from scab before trekking and they were dealt with in accordance with law.

Introductions from places outside the Union, other than the above, may not take place before a permit has been obtained for the stock which it is desired to introduce. Such permits are issued only on the production of a certificate from a veterinary officer or stock inspector that the stock are free from disease and come from an area not infected with any disease to which the animals are subject.

ISOLATION POUNDS.

Owing to certain difficulties which arose in connection with the establishment of isolation pounds on commonages as provided by the regulations, but few have been established. Consequently it has not always been possible to detain infected animals on trek. Steps are, however, being taken to establish isolation pounds at suitable centres along the railway lines and in the various trek districts, and when the arrangements are completed, it will be possible for inspectors to deal more effectively with movements of infected animals.

QUARANTINE OF INFECTED STOCK.

As it has frequently become necessary, in the past year, for inspectors to take over stock, which the owners have failed to cleanse, it is thought that Inspectors should be given power to undertake the immediate supervision of any flocks belonging to owners who exhibit negligence or incompetence.

SCAB PARASITES IN GOATS' EARS.

During the period covered by this report, Sheep Inspector Avenant drew attention to the fact that he had discovered scab parasites in the ears of goats which were apparently free from disease. Material obtained from goats' ears sent to the Veterinary Research Laboratories for examination was found to contain scab parasites, and Inspectors were instructed to pay special attention to this possible source of infection. Thereafter apparently clean flocks which comprised goats having scab parasites in their ears were treated as infected. A public outcry resulted, and the Minister was pleased to order Mr. A. V. Shilston, M.R.C.V.S., Government Bacteriologist, Pietermaritzburg, to conduct experiments with a view to proving the inter-communicability of the several varieties of scab between sheep and goats and *vice versa*.

In the meantime, as a concession to public opinion, Inspectors have been instructed not to quarantine apparently clean sheep running with goats which are apparently clean, but in the ears of which parasites are discovered. The Principal Veterinary Surgeon suggested that the inside of the ears of the goats

containing scab parasites should be washed with a mixture of oil and sulphur. Of course the affected goats are dipped.

DIPPING TANKS.

The time originally allowed by the Minister's order published under Government Notice No. 1,748 of 1911, compelling the provision of sheep dipping tanks throughout the Union was extended (by Government Notice No. 744 of 1912) until the 31st July, 1912.

During the twelve months ended 31st December, four thousand five hundred and fifty-three tanks were provided in the Union as follows:—

Orange Free State	...	...	...	...	...	452
Natal and Zululand	...	...	...	...	...	421
Transvaal	...	...	...	...	...	1,242
Cape Proper	...	...	...	...	...	2,048
Transkeian Territories	...	...	...	...	...	138
Bechuanaland	...	...	...	...	...	252
						<hr/> 4,553

The above figures are most gratifying, and show that farmers are taking a keener interest in dipping than ever before, and this will, undoubtedly, have good results.

It is regretted that, owing to the lack of information (except in the case of the Cape Province), it has not been possible to give a comparative statement of the number of tanks provided in the previous years. In the case of the Cape, Bechuanaland and the Transkei, six hundred and sixty tanks were provided during the year 1911-12, as against two thousand four hundred and thirty-eight in 1912-13. It will therefore be seen that considerable progress has been made in this direction in that the numbers of tanks provided in the Cape in 1912 exceeded the number provided in 1911 by one thousand seven hundred and seventy-eight. As a large number of tanks have still to be built in terms of the Minister's order, action is being taken against all defaulters.

The total number of tanks in the Union will be found in the appended statement (No. 2). Unfortunately the powers conferred by the existing legislation are not so wide as is desirable, and this has handicapped the Division in its work of causing sheep dipping tanks to be constructed on every farm where sheep are kept. The defects were, however, dealt with in a draft Bill submitted to Parliament, and with the additional authority contained in the Dipping Tanks Further Provision Act, 1913, it should be possible to overcome all difficulties in this direction.

Steps are being taken to construct tanks in all native locations, and it is hoped it will, before long, be possible to construct tanks on all Crown Lands on which sheep are kept throughout the Union.

On the advice of this Division, a large number of circular tanks have been built, which tanks are becoming more and more popular, as the farmers are finding out that they are not only more economical in construction and in the use of dipping material, but also more effective in that sheep can be kept swimming the full period of their immersion with considerably less handling than that required to keep sheep immersed for two minutes in the straight tanks generally found in South Africa.

PREJUDICE AGAINST DIPPING.

The manner of dipping small stock and the benefits to be derived therefrom are, it is regretted, not yet sufficiently understood by all farmers in the Union, with the result that there is still a great deal of opposition to dipping. Some farmers are negligent and do not give sufficient (or any) attention to the preparation of the dip and the dipping of their stock which, in many cases, are left to their natives, whereas others again will not believe that scab is caused by a parasite, or that it can be cured by dipping. Dippings performed by such persons are, as a rule, carried out without regard to the capacity of the tank, the length of time the sheep are immersed or to the breaking up of scabby crusts, and invariably result in failure and disappointment.

In order to convince the unbelieving farmers of the efficacy of dipping as a means of eradicating scab, Inspectors have been instructed, whenever opportunity offers, to supervise one or two dippings performed by such persons with a view to giving them every possible assistance and advice in regard to the preparation of the dip and the manner in which the sheep should be dipped if success is to be ensured. In consequence of this instruction much good work has been done and Inspectors have, in many instances, been requested by farmers to dip infected flocks before the expiry of cleansing orders. This is gratifying, in that it shows that the farmers are gradually exhibiting more faith in the Inspectors and in dipping. The following number of sheep and goats were dipped under the supervision of the Inspectors and the Field Cornets (Transvaal), *viz.*:—

Province.	Flocks.	Sheep and Goats.
Cape Province	3,593	903,763
Transvaal Province	1,973	175,765
Transkei	40,679	2,296,155
Orange Free State	628	227,999
Natal	1,428	104,555
Grand Total	48,301	3,708,237

DIPPING AND DIPPING MATERIALS.

In connection with this question of dips and dipping, it has been found necessary to institute inquiries as to the best methods of dipping small stock for scab, as well as to ascertain which dips give the best results. This work is receiving the attention of Mr. A. V. Shilston, who is conducting a series of tests on behalf of this Division.

It was necessary to experiment, not that there is any reason to doubt that lime and sulphur and caustic soda and sulphur dips (if used as prescribed by the Department) will cure scab, but because in one or two instances where dipping was carried out under supervision with materials other than those mentioned, the results were not entirely satisfactory, and thus tended to throw discredit on the Department. This Division holds the view that when the Inspector takes stock over for cleansing his work should exhibit a maximum of effectiveness combined with a minimum of expense and damage to the stock treated. It is with this end in view that experiments are being continued.

The dips which the Division has consistently advised farmers to use on their flocks for the eradication of scab are lime and sulphur or caustic soda and sulphur, but more particularly lime and sulphur. These dips are recommended because experience in South Africa, Australia and America has shown that they are most effective and most economical scab-destroying preparations with preventive, as well as curative, properties. Farmers are using them more largely than heretofore, and with beneficial results.

In consequence of the statement made by the Bradford Chamber of Commerce, that lime in wool in any form, makes the fibre brittle, stunts its growth, saps its elasticity, disqualifies it altogether for taking certain dyes and finally weaves it into an altogether inferior fabric, the Member for Ladybrand, in the House of Assembly, asked the Minister the following question:

“Whether it was a fact that the sheep dips commended by the Agricultural Department to South African farmers, consisting of lime and sulphur or caustic soda and sulphur, was considered by woollen manufacturers in England, and eminent authorities on the subject in France, Germany and the United States, to be highly injurious to the staple of wool, and whether he approved of the sheep dips which had been recommended?”

In view of the tests which the Cape Agricultural Department had made by manufacturers in England in order to ascertain the effect on wools which had been dipped in different kinds of dips it pleased the Minister to make the following statement to Parliament on the subject, *viz.*:—

“Representations were made by the manufacturers of woollen goods in England several years ago to the effect that lime and sulphur and caustic [U.G. 47—'13.]

soda and sulphur as sheep dips are injurious to the wool staple. He is not aware of such representations having been made by eminent authorities on the subject in France, Germany and the United States of America. In 1908 twelve fleeces of wool were sent to a well-known gentleman in England, who is strongly opposed to the use of lime and sulphur as a sheep dip, with the request that he would have a report made thereon by someone in the manufacturing trade. Three of the samples were shorn from sheep which had been dipped in lime and sulphur at three, six and nine months' growth respectively, three from sheep dipped in one kind of proprietary dip at the same stages of growth, three from sheep dipped in another kind of proprietary dip at the same stages of growth, and three from sheep which had not been dipped. The fleeces were numbered by the Department from one to twelve. The gentleman referred to was not informed which dips had been used, and he furnished a report in due course according to the numbers. On the samples dipped at three months' growth, the report stated that the one dipped in lime and sulphur 'washed quite naturally,' and again 'it was a good commercial wool and above the Cape average,' and of the samples dipped in proprietary dips it was said 'the colour was good, generally sound, well grown and a very desirable class of wool'; also 'I found the wool to wash quite naturally' and 'I had no difficulty in scouring this wool'; while of one sample dipped in a proprietary dip, which certainly contained no *lime*, it was said: 'At the bottom of one fleece the staple was fastened together and gave me the impression that they were *lime* crystals.' As regards the dyeing results, the report stated with reference to the three samples dipped in one proprietary dip:

- "Sample 1, pink shade—level and true.
- "Sample 4, blue shade—light and dark in places.
- "Sample 7, shade fairly even, not by any means perfect;

and then the report adds: '*Has the dip had a greater percentage of lime in it than sulphur?*'

"As regards the three samples dipped in the other proprietary dip, the results were stated to be:—

"Sample 2, dark brown—light and dark in places, some being quite olive and others a very heavy and dead brown.

"Sample 5, puce shade—passable and a good commercial colour.

"Sample 8, light blue—shade not level, true or even.

"The results of dyeing the wool dipped in lime and sulphur showed:—

"Sample 3, olive brown—very uneven and very unsatisfactory.

"Sample 6, blue—lacks uniformity, light and dark in places.

"Sample 9, blue—a rotten one, little yellow in parts.

"The gentleman referred to also stated the want of uniformity in colours, the uneven and motley appearance are 'exactly what lime and sulphur dips always do.' But according to the report, only one of the nine samples dyed true. The undipped samples showed the best results. The Government has further evidence based on very high authority in England that wool giving the best colours comes from South Africa, and that this has been the case for twenty-five years.

"With regard to caustic soda and sulphur, the Government is reliably informed that if the dip is used according to formula, the sulphur amply suffices to neutralise the last trace of free alkali in the caustic soda, and samples of wool dipped in this mixture and experimentally washed and dyed do not bear out the contention that the dip renders the wool unsatisfactory from a manufacturing point of view. For these reasons the Government sees no cause for withdrawing the recommendation which has been made for the use of these two dips for the purposes of eradicating scab."

In a letter published in the "South African News" on the 21st May, 1909, Mr. Moore, of Messrs. Moore Brothers, the well-known wool merchants and experts of Huddersfield, stated, *inter alia*:—

"The agitation against the dip (sulphur and soda) seems to be with you as it is here—manufactured and forced by those interested in proprietary dips.

When I was in South Africa I was one day approached by a gentleman who said, 'You will be asked questions at to-day's meeting about dips, and will be shown sheep dipped in the lime and sulphur solution. If you denounce it and find the wool injured by it, it will be made worth your while.' I reported the incident at the time to the Director of Agriculture. I have never either asked or received any fee from the Government or anyone else for any reports or recommendations I have made or for any services I have rendered. Can the 'newspaper experts' who have written against me say the same? I had not seen the letter in the 'Financier' until you sent me the cutting, but the writer gives his whole case away at the outset in saying that he could tell as soon as he saw the fleeces that on account of their tenderness, brittleness and harshness they had been injured in dipping. From my own observation, I defy any man living to tell from the appearance which fleeces have been dipped and which have not, provided always that a sufficient period of time has elapsed between dipping and shearing. If the writer in the 'Financier' had only a tithe of the knowledge of wool which he assumes, he would know that the faults he detected in the fleeces can be put down to other causes, and to nothing more likely than an impoverished condition of the animal as a result of scab. I should not be surprised to learn that this is the expert who found traces of injury in fleeces which had never been near the dip.

"Everything depends upon the time when the sheep are dipped, and I am of opinion that if this be done soon after shearing, say no later than three months after shearing, but the earlier the better, it will be impossible for anyone either chemically or any other way to discover any injury. On the contrary, if the scab is destroyed by reason of the dipping, the gain is incalculable.

"The writer in the 'Financier' makes much of the resolution of the Bradford Chamber of Commerce against the soda and sulphur dip, but he does not say that out of nearly two hundred invitations issued to those interested to attend a special meeting, only about half a dozen thought the matter of sufficient importance to turn up, and amongst them I did not notice a single one who is a buyer of Cape wool. One of the few present was the Managing Director of Messrs. Isaac Holden and Sons, the largest commission wool combers in the world, so I promptly sent him forty bales O.R.C. greasy wool, all of which had been dipped, and asked him to take special notice in scouring to see if any difficulty presented itself. He reported that it was impossible to detect any difference in that respect between the forty bales and the hundred and forty bales Australian with which they were mixed. Since then the wool has gone through every process of manufacture and has been dyed, some of it into most delicate shades, but the report at every stage has been 'perfectly satisfactory.' One of the half dozen present at the Bradford meeting (and he is about the only one who handles South African wool), who supported the 'Financier' correspondent when he moved the resolution of which he seems so proud, has now modified his opinion, and does not see what injury can possibly result if the sheep has from nine to eleven months' exposure to sun and atmosphere after dipping and before shearing.

"The agitation on this side is dying a natural death. Those really interested have satisfied themselves. What they want is the wool better grown, better got up, and more of it. Dip in what you like, they say, but get rid of scab."

The results of the test referred to by the Minister clearly show that the damage done to wool dipped in lime and sulphur was not greater than that in respect of wools dipped in the Proprietary dips.

This Division has not at any time contended, as stated by the "Wool Record," that lime and sulphur or caustic soda and sulphur dips are beneficial to wool. It has always held the view that before good wool can be grown by farmers, scab must first be eradicated from their flocks, and that the damage done to wool from scab-infected sheep by the dips referred to is not so great as would result if the disease were left unchecked or if it were ineffectively dealt with by other means.

As a further recommendation for the use of lime and sulphur dips in the treatment of scabby flocks, it is desired to point out that this was the official dip in Australia when scab was prevalent there, and that it was principally by its use that the disease was eradicated.

The records of this Division show that the best progress against scab has been made in those districts where this dip has been used almost exclusively.

A large number of farmers having unfortunately been prejudiced against the use of these dips further investigations are being carried out with a view to ascertaining, as far as possible, to what extent (if any) these and other dips chiefly used in South Africa affect wool. The result of these investigations will be published in due course.

LOSSES OF STOCK ATTRIBUTABLE TO DIPPING.

Considering the large number of sheep and goats dipped under the supervision of the Inspectors, there were very few losses which could be attributed to the dipping.

A considerable number of claims for compensation for stock lost as the result of dipping under supervision were lodged in terms of Sub-section (7) of the Regulations, but many of the losses were due to the carelessness of the claimants, and were therefore rejected.

Compensation, totalling £151 12s. 6d., was paid to thirteen claimants. In eight of these cases an arsenical dip was used, the mortality being due either to exposure to inclement weather immediately after dipping or to the second dipping being given within less than fourteen days after the first. In two cases a carbolic dip was used, the losses being attributable to poor condition and exposure after dipping; in one case an arsenical dip mixed with tobacco extract, the actual cause of death being unknown; in one case tobacco extract was used, the loss being due to exposure after dipping; in the last case caustic soda and sulphur was used, the actual cause of death being unknown, though it would appear to have been due to septic poisoning, and not to the use of the caustic soda and sulphur.

With a view to minimising losses by death after dipping, all Inspectors have now been instructed that, whenever possible, sulphur and lime or caustic soda and sulphur dips must be used when stock is treated by them.

DIP DEPOTS.

Frequent requests for the establishment of Government Dip Depots have been made by farmers in the North-Western Districts on account of the inadequacy of the supplies obtainable there and the lack of railway facilities, but as the depots system has not in the past been the success which was anticipated, and is beset with numerous difficulties, the establishment of these depots was not at first favoured. However, on further representation by farmers in the North-Western Districts of the Cape Province, it has now been decided to establish a few depots at out-of-the-way places in the undermentioned districts, in order to afford farmers there an opportunity of obtaining whatever quantity of dipping material they may require at reasonable rates, *viz.*:—

Namaqualand, Calvinia, Fraserburg, Kuruman, Van Rhynsdorp, Kenhardt, Gordonia, Sutherland.

It is intended to stock lime, caustic soda and sulphur only at these Depots.

SIMULTANEOUS DIPPING.

This is a question upon which there is great diversity of opinion. A large section of the farming community maintain that all sheep and goats should be dipped regularly every year at least once just after they are shorn. A second section, which comprises the majority, is of opinion that flocks which have been clean for a period of twelve months should be exempted if the owners so desire. Whilst a third section is altogether opposed to dipping.

There is no doubt at all that the dipping of sheep, at least once a year, is most beneficial to their health, in that it kills all the scab parasites, ticks, keds, and lice they may be harbouring and thereby prevents the spread of diseases such as heartwater, etc., which are believed to be transmitted by ticks.

Notwithstanding that there is no scab in Australia, the annual dipping of sheep is considered so necessary to their health that an Act has been passed in certain States by which the dipping of all sheep within six weeks after they have been shorn has been made compulsory.

In deference to the opinion of the majority, it has been deemed advisable in the Union, to exempt all flocks which have been clean for twelve months from the dippings laid down in the simultaneous dipping orders.

In order to find out the most suitable period for dipping in the various districts of the Union, all Magistrates were requested by circular letter to ascertain the views of the farmers in their respective districts as to the suitability of the months of March and April, and if these were not regarded as suitable, to give reasons why and to mention two months which would satisfy the majority.

As was expected, the replies received indicated a wide difference of opinion between districts and even in the districts themselves, but the majority of the districts having declared in favour of March and April, it was decided to proclaim simultaneous dipping during those two months. On representations from certain Senior Inspectors that the emaciated conditions of flocks in some of the districts under their control would not permit of their being dipped until rain fell, and there was an improvement in the veld, it was decided to allow such districts to select any two months between the 1st of March and the 30th November, for compliance with the Minister's Order published under Government Notice No. 284 of 1913, on condition that, until such time as the above Order has been carried out, no movements of stock from such districts will be permitted into districts which have dipped in terms of the said Order, excepting under permit which can only be granted for sheep which have been given two dippings, or which have been exempted. The following districts availed themselves of the exception, and agreed to carry out the simultaneous dipping during the period mentioned against each, *viz.* :—

Boshof, 1st March to 31st May.

Prieska, 1st March to 31st May.

Jacobsdal, 1st March to 10th May.

Kenhardt, 20th May to 30th June.

Calvinia, Sutherland Van Rhynsdorp and Namaqualand, still indefinite.

On account of the delay which has occurred in the construction of dipping tanks in Zululand, dipping there has been postponed until June.

With the exception of the abovementioned districts and the Transkeian Territories (in which one simultaneous dipping has already been completed previous to the 1st March), dipping operations have commenced in all districts, and will be completed on the 30th April.

A number of dipping supervisors has been appointed in each district to supervise in so far as possible the dippings of all flocks in the areas for which they have been appointed—particular attention being given to native flocks. Inspectors have been requested to use their best endeavours to persuade all those owners who have been exempted to dip their sheep also in the interest of the campaign against scab, and it is gratifying to state that in a large number of cases owners have willingly complied. A further report will be issued on this matter when dipping operations have been completed, and it is possible to gauge the measure of success attained.

Complaints having been made that insufficient notice of the enforcement of simultaneous dipping was given it is desired to explain that the delay was due to the prolonged drought from which the country was suffering in that it was not deemed advisable to proclaim dipping until the Division had received information that stock had sufficiently recovered to enable them to undergo dipping without loss. As it was expected that the collection of information would take considerable time, a public notice was in January, 1913, inserted in practically all newspapers circulating in the Union informing the public of the Government's intention to enforce simultaneous dipping as from about the 15th March, and warning farmers to keep themselves in readiness to comply with the subsequent order. More than the above, it is thought, could not, in the circumstances, have been done.

PROSECUTIONS.

By a perusal of the statement (No. 3) hereto appended, it will be observed that there is a complete absence of uniformity in the fines imposed in the several districts of the four Provinces for scab offences, and that some of the fines inflicted are so small that they can hardly be considered commensurate with the offences committed, and the harm done to the country by the transgressors. The heaviest fines have been imposed in the Midland and Eastern Districts of the Cape Province, and the lightest in the Transkeian Territories and the North-Western Districts of the Cape. This will probably partly explain the greater prevalence of scab in the two latter areas as compared with other parts of the Union. The average fine imposed for contravening the Scab Laws during the six months ended 31st

December, 1912, was £2 16s. 7d., and in one instance only (in the Piet Retief district of the Transvaal) was the maximum penalty of £50 imposed.

From questions frequently asked at farmers' meetings (why the fines for like offences imposed in some districts are so much smaller than in others and whether it is expected that scab will be eradicated whilst the law can be set at defiance at the expense of a nominal penalty) it would appear that there is a considerable amount of public dissatisfaction regarding this matter.

In referring to this subject, it is not intended to criticise the sentences of individual Magistrates, but merely to bring to notice the fact that in many instances the fines imposed are so light that they cannot be regarded as deterrents, though doubtless intended to act as such. It is therefore hoped that these remarks will be accepted in the spirit in which they are put forward, and will not be allowed to impair the spirit of co-operation and good feeling existing between Magistrates and Officers of this Division.

INSPECTION AT JOHANNESBURG.

A great deal of criticism was at one time, during the period under review, levelled against the system of inspection obtaining at the Johannesburg Abattoirs, but Mr. Hunt, the President of the Transvaal Agricultural Union, who was delegated by that body to investigate and report on the matter found that the complaints and criticisms were without foundation and complimented both the Department and the Johannesburg Municipality on the efficient manner in which stock is being dealt with at that place.

Briefly, the system in vogue is as follows:—

All consignments arriving by rail are off-loaded by the railway checkers and handed over to a Municipal Inspector, stationed at the entrance. The sheep and goats are counted and taken to the pens provided, and the numbers of the pens in which the animals are placed and the truck numbers, together with the names of each consignor and consignee, are duly recorded in a register kept for that purpose. The Sheep Inspector examines the sheep in the pens, and if scab is found, or the animals appear infected, the consignment is provisionally quarantined until the diagnosis can be confirmed by microscopical determination of scrapings taken from suspected or infected animals. The presence of scab once ascertained, the animals concerned are removed to special isolation pens and are not allowed to leave the abattoirs alive; infected consignments are generally slaughtered within forty-eight hours and the skins are thoroughly disinfected. Should the Inspector's diagnosis not be confirmed by microscopical examination (and this occurs very rarely), the provisional quarantine is raised forthwith and the owners are at liberty to remove their sheep where they please.

On account of the excellent facilities which the Municipality has provided, it is possible to examine sheep more thoroughly at Johannesburg than at any other place, and for this reason it has been used as a training ground for inspectors, and for the practical examination of candidates for employment. Some excellent Inspectors have been passed out by Mr. Kieser, the Sheep Inspector in charge.

It has been stated that the examination at Johannesburg is unnecessary, because the sheep sent thither are intended for slaughter; but this is not the case, as the Johannesburg market is largely used as a distributing centre for the Reef, Pretoria and other places. By means of the check inspection at Johannesburg, it is possible to obtain evidence in support of prosecutions for movements of infected stock thither from all parts of the Union. With a view to preventing, before despatch from the sending stations, the movement of infected flocks intended for Johannesburg, the ten railway inspectors already referred to have recently been appointed to examine stock on the various sections of the railway system, and it is trusted they will do good work.

The seventy-eight thousand, two hundred and seventy small stock quarantined at Johannesburg in 1912 were received from the several Provinces in the following proportions:—

Cape Province: 68,300, of which 3,860 were visibly infected. (About two-thirds of the above came from the North-Western Districts, and consisted principally of Afrikaner and Bastard Sheep).

Orange Free State: 7,093, of which 158 were visibly infected.

Transvaal Province: 2,877, of which 100 were visibly infected.

NUMBER AND PERCENTAGE OF INFECTED SHEEP.

The percentages of infected sheep in the several Provinces of the Union on the 31st December, 1911, and 1912, are shown in the two following statements, "A" and "B":—

Showing Number and Percentage of Infected Sheep in the different Provinces of the Union on 31st December, 1912.

STATEMENT "A."

	Under order to cleanse on 31st December.		Percentage of flocks infect d.	Percentage of small stock under quarantine. 31st December 1912.	Percentage of small stock under quarantine 31st December 1911.	No. of visibly infected animals.	Percentage of visibly infected animals.
	Flocks.	Sheep and goats.					
Transvaal	335	126,455	.91	2.05	3.75	2,269	.03
Orange Free State	744	388,653	2.47	3.46	3.84	3,969	.03
Natal and Zululand	228	43,794	.74	1.58	..	1,858	.06
Cape Province, Bechuanaland and Transkei	3,765	1,000,998	3.01	3.65	3.45	26,473	.09
Total and Percentage for the Union	5,072	1,559,900	2.24	3.27	..	34,569	.07
Cape Proper	1,186	Details of the figures for the Cape Province.	1.85	2.86	3.3	8,400	.03
Bechuanaland	760	650,050	10.11	10.69	..	3,117	.27
Transkei	1,819	229,195	3.42	6.39	2.66	14,956	.41
	3,765	1,000,998	3.01	3.65	..	26,473	.09

STATEMENT "B."

1912 Percentage of Scab.	Province.	Free from Scab.		Under 1 % of Scab.		1 % and under 3 % of Scab.		3 % and under 5 % of Scab.		5 % Scab and over.	
		No. of Districts.	No. of Small Stock.	No. of Districts.	No. of Small Stock.	No. of Districts.	No. of Small Stock.	No. of Districts.	No. of Small Stock.	No. of Districts.	No. of Small Stock.
2.86	Cape Proper	13	1,592,917	29	6,347,126	19	5,407,428	9	4,979,603	9	4,350,787
10.69	Bechuanaland .. .. .	..	..	..	..	..	..	..	..	4	1,138,886
6.39	Transkei	5	417,473	5	469,288	4	403,845	..	481,396	12	1,814,246
3.46	Orange Free State	2	489,856	4	1,497,232	9	5,155,939	3	2,331,173	5	1,773,976
2.05	Transvaal	2	82,380	8	2,155,415	9	3,106,235	1	504,152	1	312,229
1.58	Natal (including Zululand)	3	184,378	3	436,723	4	1,793,769	..	..	1	353,631
		25	2,767,004	49	10,905,784	45	15,867,216	17	8,296,324	32	9,743,755

In connection with Statement "A," it has been considered advisable to show the percentages of infected stock in three different ways; the first shows the percentage of infected flocks, the second shows the percentage of small stock actually under quarantine and the third shows the percentage of sheep showing visible signs of the disease.

In regard to the percentages given for Natal, Bechuanaland and Zululand in the abovementioned statement, it is desired to point out that these only show the actual number of infected animals under quarantine on the 31st of December which were found by or reported to the Inspectors, and that these percentages cannot be regarded as reflecting the true state of affairs, as it was impossible to have all flocks in those areas thoroughly examined before the 31st December last, owing to the fact that the number of Inspectors there are inadequate, and that the majority were appointed only a few months prior to the 31st December.

Unfortunately a comparative statement of the state of infection in the Union during 1911 and 1912 cannot be given for all four Provinces, owing to the absence of figures for Natal in respect of 1911. The following comparative statement is, however, submitted in respect of the other three Provinces:—

1911.		
Province.	No. of sheep on 31st December.	No. of sheep in quarantine on 31st December, 1911.
Transvaal	5,126,018	180,000
Cape	28,926,422	1,001,179
Orange Free State ..	9,636,209	370,560
Totals	43,688,649	1,551,739 or 3.55%
1912.		
Province.	No. of sheep on 31st December.	No. of sheep in quarantine on 31st December, 1912.
Transvaal	6,160,411	126,455
Cape	27,402,995	1,000,998
Orange Free State ..	11,248,176	388,653
Totals	44,811,582	1,516,106 or 3.38%

It will thus be seen that there is a slight improvement to the extent of .17 per cent. in the Provinces of the Cape, Transvaal and Orange Free State. It is to be remembered, however, that Inspectors have been appointed to areas where formerly there were none, and that in consequence more infected sheep have been discovered than was formerly the case; and it is clear that the percentages previously given (and even the present ones) are purely approximate, and that the improvement is actually greater than is reflected by the above figures.

The following are the districts in which scab was most prevalent on the 31st December, 1912:—

Aberdeen,
Calvinia,
Ceres,
Fraserburg,
Murraysburg,
Sutherland,
Wodehouse,
Kuruman,
Vryburg,
Nqamakwe,
St. Marks,
Matatiele,
Mount Frere,
Bizana,
Libode,
Tabankulu,
Bethulie,
Fauresmith,
Jacobsdal,
Smithfield,

Barkly East,
Carnarvon,
Cradock,
Kenhardt,
Prieska,
Victoria West,
Gordonia,
Mafeking,
Elliot,
Engcobo,
Maclear,
Mount Currie,
Tsolo,
Flagstaff,
Ngqeleni,
Lichtenburg,
Edenburg,
Heilbron,
Philippolis,
Zululand.

With regard to Statement "B," it has not been possible to furnish comparative figures for 1911 and 1912, except in the case of the Cape of Good Hope. The following statements show the amount of infection in the Cape Province Proper for last ten years, and in the Transkeian Territories for the last eight years:—

CAPE PROVINCE PROPER.

Year.	Free from Scab.		Under 1% of Scab.		1% and under 3% of Scab.		3% and under 5% of Scab.		5% Scab and over.		Percentage of Infected Stock on 31st December
	No. of Divs.	Number of Stock.	No. of Divs.	Number of Stock.	No. of Divs.	Number of Stock.	No. of Divs.	Number of Stock.	No. of Divs.	Number of Stock.	
1903	4	122,780	6	984,121	9	2,330,172	5	1,103,161	51	10,133,373	12·73%
1904	7	263,464	6	1,018,398	21	4,612,219	11	2,437,049	30	7,735,702	5·55%
*1905	10	904,189	18	4,402,760	12	3,344,645	8	1,977,262	23	5,500,500	4·84%
†1906	11	1,147,181	20	5,689,837	23	6,496,793	9	1,767,036	11	3,415,942	2·88%
‡1907	9	1,073,825	18	4,916,584	29	9,850,213	7	1,951,523	12	3,956,617	2·54%
§1908	6	1,020,637	27	7,524,627	26	7,559,444	9	1,823,832	9	2,948,868	2·63%
¶1909	9	1,323,617	19	4,959,911	33	10,728,501	8	2,603,673	9	2,636,254	2·70%
1910	7	170,048	26	7,596,019	24	7,112,320	8	2,994,661	13	4,572,803	3·61%
1911	14	1,741,799	24	7,942,498	24	7,879,902	5	1,566,763	11	4,236,747	3·56%
||1912	13	1,592,917	29	6,347,126	19	5,407,428	9	4,979,603	9	4,350,787	2·87%

* 4 Divisions omitted. † 1 Division omitted. ‡ 1 Division omitted, and Laingsburg added. No returns from 1 Division. § 1 Division, Steytlerville, added. ¶ 1 Division, Montagu, added. || 1 Division added.

TRANSKEIAN TERRITORIES.

Year.	Free from Scab.		Under 1% of Scab.		1% and under 3% of Scab.		3% and under 5% of Scab.		5% Scab and over.		Percentage of Infected Stock on 31st December
	No. of Divs.	Number of Stock.	No. of Divs.	Number of Stock.	No. of Divs.	Number of Stock.	No. of Divs.	Number of Stock.	No. of Divs.	Number of Stock.	
1905	3	458,709	6	601,316	6	699,585	6	936,534	8	784,619	5·90%
1906	8	806,883	10	1,187,319	6	793,475	2	154,703	3	455,696	1·81%
1907	12	967,611	9	1,211,103	2	311,133	—	—	6	851,711	2·17%
1908	8	994,353	10	1,259,471	4	456,896	4	401,917	3	292,688	1·89%
1909	6	604,442	13	1,584,238	5	901,726	2	77,492	3	422,469	3·07%
1910	4	512,128	10	1,508,652	9	1,069,990	3	293,259	3	341,600	2·51%
1911	4	421,241	7	872,946	9	1,448,241	3	377,802	6	757,966	2·66%
1912	5	417,473	5	469,288	4	403,845	3	481,396	12	1,814,246	6·39%

The above figures show a slight improvement during 1912, which in view of the drought experienced in that year is gratifying.

It is trusted that the simultaneous dipping now being carried out will help still further to reduce the number of infected flocks throughout the country.

NORTH-WESTERN DISTRICTS OF CAPE PROVINCE.

Meetings were held at the following places in the respective districts mentioned:—

Sutherland,	District	Sutherland.
Fraserburg,	"	Fraserburg.
Williston,	"	Fraserburg.
Brandvlei,	"	Calvinia.
Calvinia,	"	Calvinia.
Nieuwoudtsville,	"	Calvinia.
Louriesfontein,	"	Calvinia.
Van Rhynsdorp,	"	Van Rhynsdorp.
Nieuwerust,	"	Van Rhynsdorp.
Garies,	"	Namaqualand.
Bowesdorp,	"	Namaqualand.
Springbok,	"	Namaqualand.
Rietfontein,	"	Namaqualand.
Griqua Town,	"	Hay

Strong representations were made at these meetings that the North-Western Districts, on account of their peculiar climatic conditions, should be cut off from the remainder of the Union, and be given a more lenient Scab Law under which infected animals could be moved after dipping the visibly infected ones. It was

pointed out that if this request were acceded to steps would have to be taken to protect the rest of the Union where an endeavour is being made to get rid of scab, and that all flocks from the Cape, North-West, would have to be twice dipped before being allowed to cross the border line. The farmers were clearly told that it was to their interest to fall into line and comply with the existing law rather than to be cut off. With one exception—Calvinia—all the Districts concerned agreed to co-operate with the Inspectors and carry out the law, as they feared that if they did not do so they would suffer loss. It is most gratifying to observe that the farmers have kept their promises in that they are endeavouring to eradicate the disease. The following comparative statement of tanks provided during the last two years indicates a decided improvement:—

District.	1911. Tanks provided.	1912. Tanks provided.
Calvinia	12	347
Sutherland	2	127
Van Rhynsdorp	5	39
Namaqualand .. .. .	..	91
Fraserburg	19	77
	38	253

There is still a great deal of opposition to be encountered in Calvinia and Sutherland, and it is feared that whatever improvement is made by the willing section of the farmers in those two districts will be negated by the neglect of others.

The want of progress in the North-Western Districts is due to two causes: firstly, the farmers' lack of faith in dipping as a cure for scab, and secondly, the want of railway and other transport facilities generally and a consequent lack of water, coal and cement.

There is no doubt that the farmers in the North-West suffer great disadvantages through the lack of railway communication, and are too often condemned as unprogressive by persons living under far better conditions. The questions are frequently asked: Why do these people not bore for water? Why do they not construct weirs and erect windmills? and so on; but the people who ask these questions have no conception of what it means to be in a country of long distances, where rain seldom falls, and where the only water supplies are limited and the water that can be obtained is very highly mineralised. There are hundreds of nomadic farmers who do not own any land, and those who do own land are handicapped for want of boring machines, coal and building materials. Railway communication is essential for the development of this part of the country, and the possibilities of building up sheep-breeding and horse-breeding industries and the production of wheat appear to be such as to justify the construction of a railway. With proper railway facilities, there is no reason why the North-Western Districts of the Cape Province should not become Merino districts of considerable importance.

The prejudice against dipping for scab is very great, but it is largely due apparently to the agitation of a few interested persons who have axes to grind. The remedy is education, and this will naturally take time.

TRANSKEIAN TERRITORIES.

It is regretted to report that no progress has been made in the undermentioned areas in the Transkeian Territories, notwithstanding the large staff (as compared with other parts of the Union) there employed, and the number of times all sheep and goats are dipped each year:—

Nqamakwe,
St. Marks,
Maclear,
Mount Currie,
Tsolo,
Flagstaff,
Ngqeleni,

Engcobo,
Umtata,
Matatiele,
Mount Frere,
Bizana,
Libode,
Tabankulu.

The failure appears to be due to the following causes:—

- (1) The severity of the drought;
- (2) The system of communal grazing in vogue;
- (3) Failure to cleanse infected kraals;
- (4) The small fines imposed for contraventions of the Scab Law;
- (5) Incompetent inspection and dipping;
- (6) The ineffectiveness of the dipping materials employed and the lack of transport for the supply of efficient dipping specifics.
- (7) The practice of hiding infection adopted by the natives.

No effort will be spared during the ensuing year to bring about an improvement, but as will be gathered from the above, there are many problems to be solved, and the task is a difficult one which will take considerable time.

SHEEP AND WOOL.

Shortly after the formation of this Division a conference of all Sheep and Wool Experts in the Union was held at Pretoria for the purpose of affording these officers an opportunity of exchanging ideas and discussing the various subjects affecting their work, with a view to bringing about uniformity of method.

A definite line of action in regard to the classing and mating of sheep and the classing and marketing of wool was agreed upon, and further as the Transvaal Province had four experts as against one in the Cape Province (which contains a much larger number of sheep), it was decided to transfer one of the Transvaal officers to the Cape Province.

The above reorganisation had no sooner been completed when the Division lost the services of the late Mr. M. J. D. Steyn, one of its ablest Assistant Sheep and Wool Experts, who died from an attack of enteric fever contracted whilst on duty. By his zeal, tact and ability, Mr. Steyn had won for himself a good name wherever he went. His loss is greatly regretted by all his Colleagues as well as by the farmers with whom he had come into touch. Mr. A. M. Spies, formerly a sheep inspector and a breeder of Stud Sheep in the Orange Free State, has been appointed in Mr. Steyn's place, and is now on duty in the Western Transvaal with his headquarters at Potchefstroom.

On the promotion of Mr. A. G. Michaelian to the management of the Government Stud Farm, Ermelo, Mr. Pickles, a young Australian of considerable experience, has been appointed as Assistant Sheep and Wool Expert for the Eastern Transvaal, with his headquarters at Ermelo. The staff of the Cape Province has lately been strengthened by the appointment of Mr. Taylor as an Assistant Sheep and Wool Expert. Mr. Taylor received his training on one of the best Stud farms in Australia.

The total number of Sheep and Wool Experts at present employed by the Division is nine, and they are stationed as follows:—

Transvaal:—

Mr. C. Mallinson, Pretoria.
Mr. A. M. Spies, Potchefstroom.
Mr. R. B. Pickles, Ermelo.

Natal:—

Mr. J. J. McCall, Pietermaritzburg.

Orange Free State:—

Mr. J. F. McNab, Bloemfontein.
Mr. A. V. M. Suter, Bloemfontein.

Cape:—

Mr. W. M. McKee, Queenstown.
Mr. E. V. Goddefroy, Worcester.
Mr. P. S. Taylor, Steynsburg.

The above number being out of all proportion to the needs of the farmers, provision has been made in the Estimates now before Parliament for the appointment of three additional men, one to be stationed in the Orange Free State, and two in the Cape Province.

During the period under review a large amount of valuable work has been performed by this branch of the staff. They have judged at all the principal

and many of the smaller Agricultural Shows, given demonstrations and lectures, assisted farmers in selecting suitable rams for their flocks, classed a large number of sheep and clips and attended to a considerable amount of correspondence from farmers seeking information and advice.

Mr. McNab was away on six months' leave of absence as from the 29th of April, 1912, and whilst in Australia his services were made use of in purchasing Stud Sheep for the Government Stud Farms and for farmers. He purchased over nine hundred Wanganella and Tasmanian Ewes and Rams valued at £12,000 landed at Durban.

Mr. Spies, who had also gone on a three months' trip, returned in charge of the stock purchased by Mr. McNab.

The Sheep and Wool Experts have, for the last few years, spent the greater part of their time in giving advice and assistance to farmers in the classing and mating of their flocks, and there is no doubt that as a consequence of this advice, considerable improvements in the flocks of the Union have been brought about. From the attached return (No. 2) which has been prepared from information collected by the Field Cornets of the Transvaal and the Sheep Inspectors of the other Provinces, it will be observed that, notwithstanding the severe drought which caused the death of thousands of small stock, the increase in Merinos during the last eighteen months has been remarkable. Since the taking of the last Census, eighteen months ago, the number of woolled sheep in the Union has been increased by 5,489,855 and the Angora goats by 119,766, whereas the number of non-woolled sheep (Afrikander and Bastard) have decreased by 253,330, and the ordinary Boer goats by 10,958. The following summary will show the increases and decreases of small stock in each of the Provinces, *viz.* :—

STATEMENT SHEWING INCREASES AND DECREASES IN THE NUMBER OF SMALL STOCK IN THE VARIOUS PROVINCES, ON THE 31st DECEMBER, 1912, AS COMPARED WITH LAST CENSUS.

Province.	Increase.		Decrease.		Increase.		Decrease.	
	Woolled Sheep.	Other.	Woolled Sheep	Other.	Angora Goats.	Other.	Angora Goats.	Other.
Cape Proper	1,637,970	—	—	34,196	369,137	—	—	206,212
Bechuanaland	90,305	39,830	—	—	—	21,680	18,485	—
Transkei	459,859	—	—	62,804	—	45,085	22,203	—
Natal Proper	428,932	—	—	88,179	—	—	50,383	51,924
Zululand	49,704	—	—	30,966	604	2,171	—	—
Orange Free State ..	2,054,604	—	—	198,320	—	—	86,477	157,840
Transvaal	768,481	121,305	—	—	—	156,082	72,427	—
	5,489,855	161,135	—	414,465	369,741	225,018	249,975	235,976

It is reckoned that the increase of 5,489,855 woolled sheep and the 119,766 Angoras have, added at the rate of four pounds per animal, 21,959,420 pounds of wool and 479,064 pounds of mohair to our annual production, which at the low rate of 6d. per pound, equals £560,962 increased revenue to the country per annum.

The reduction of non-woolled sheep is gratifying, as it shows that farmers are realising that it pays better to breed Merinos than Afrikanders or Bastards. The change is particularly noticeable in the Orange Free State where, for the last few years, the flocks have been steadily graded up by the importation from Australia of purebred stock, of good quality and by extensive culling of weeds and bastards.

Both Mr. Mallinson and Mr. McNab report that the flocks of Merinos in the Union are becoming more uniform and more true to type. They reckon that the quality of the sheep exhibited at the Port Elizabeth, Johannesburg and Bloemfontein Shows is a great improvement on the exhibits of previous years, and that on account of the general improvements which have taken place in the flocks, it is now much easier to purchase good flock rams as well as good stud rams than what it was a few years back. Even in districts such as Calvinia, Kenhardt, Van Rhynsdorp, Fraserburg, etc., the number of Merinos have increased, and woolled sheep are not now so unpopular as they were at one time.

A large amount of the progress made is undoubtedly due to the excellent work done by the Agricultural Societies in the Union. The Societies have been indefatigable in their labours to make their shows instructive and to stimulate the spirit of rivalry and good fellowship amongst the farming community. The

enthusiastic crowds which are seen at every show is a proof of the success which they have achieved. It is trusted the Societies will continue their good work with renewed vigour, and that they will receive that support from all farmers which they so richly reserve.

WOOL CLASSING.

On account of the inadequacy of the number of Experts, it has not been possible to render assistance in wool classing to all farmers who have sought instruction therein. With a view to strengthening this branch of the Division, an endeavour has been made to train sheep inspectors in wool classing in order that they may, in addition to their other duties, assist the Sheep and Wool Experts whenever required, but, owing to pressure of work, it has been possible to train but few. If, however, even a few are trained each year, there will soon be a large number available for service in their respective areas during each shearing season. It is particularly desired to get the inspectors in areas free from scab trained in this work, as they would have the time to devote to work of this sort.

During the last shearing season five temporary Wool Classers were employed to assist the Experts in advising farmers in wool classing and the getting up of their clips.

It is regretted to report that wool classing is not receiving more encouragement from the wool buyers at the Coast, as there is very little difference in the prices paid for classed and unclassed wool. Certain buyers have endeavoured to discourage farmers from classing by condemning the methods of the Experts in the getting up of the clips. These buyers seem to be under a misapprehension regarding the number of classes into which the experts generally class. Small clips are sorted into the following classes:—

First Fleeces—Pieces.
Second Fleeces—Bellies.
Locks.

It is only in larger clips, and when considered necessary on account of lack of uniformity in the wool, that clips are sorted into Third Fleeces and Second Pieces.

The action of wool buyers who advise against classing and who will not give the prices (less shipping expenses, of course) which farmers can obtain in London is deprecated, and it only tends to drive business away from South Africa, because our farmers are not so foolish as to sell at the coast at any price offered when better prices are obtainable in London and elsewhere. On several occasions when the local buyers have refused to give fair prices for classed clips, the owners, acting on the advice of this Division, have shipped direct to London with most satisfactory results, realising in every case a much higher price than that obtainable at the Coast.

To illustrate the difference in price offered at the coast and that obtained in London, the following is an excellent example: A consignment prepared in the Cape into the following classes by Assistant Sheep and Wool Expert Goddefroy realised in London the prices set against each class:—

Twenty-four bales superior comb	...	...	...	...	3d.
Thirteen bales First Comb	...	...	...	...	11 $\frac{3}{4}$ d.
Twenty-eight bales first Comb	...	...	...	...	11d.
Four bales Clothing	...	...	...	...	9 $\frac{1}{2}$ d.
Four bales Bellies	...	...	...	...	6 $\frac{3}{4}$ d.
One bale Stained wool	..	...	...	...	5 $\frac{1}{2}$ d.
One bale Locks	...	...	...	...	4 $\frac{1}{2}$ d.
Two bales First Lambs	...	...	...	...	11d.
Two bales Second Lambs	...	...	...	...	8 $\frac{1}{2}$ d.

Whereas the highest price offered for the same consignment at the coast was 9d. per pound for fleeces and 4 $\frac{1}{2}$ d. for pieces and locks. It is admitted that the above consignment was sorted into more classes than usual, but in this case it was considered necessary on account of its size and condition; notwithstanding this, the prices realised in London were the highest obtained for Cape wool during the series of sales then held.

Mr. McNab and other experts reported numerous cases where farmers could not obtain fair prices for their wool at the coast, and on shipping to Europe obtained better prices. The result is that the number of farmers who ship direct to Europe is becoming larger every year.

The officers of this Division have always advised farmers to sell their wool at the coast, but if certain buyers at the coast will not give fair market value for classed clips, and continue condemning classed wool, there is no other course open but to advise farmers to ship direct to London or other markets, where they will receive a fair price for their wools. It is trusted that it will not be inferred from the above remarks that good prices are never paid in South Africa for good wool, because some excellent prices have been obtained locally, but such prices are more the exception than the rule and are given chiefly in those cases in which the Coastal commercial houses confine themselves to legitimate wool-broking and do not speculate.

WOOL PRICES.

During the period under review, the prices realised for greasy Merino wools at coast ports ranged between 5d. and 11½d., whilst those obtained in London varied between 5½d. and 2s. 1d. per pound, according to quality.

It is feared that no improvement will take place in our wool trade before we have a wider market and more competition than at present. This Division will spare no effort to bring this about. An endeavour is being made to interest Japanese and American buyers in South African wool. Manufacturers in Japan who do large business in fine wools will do well to send their buyers to South Africa. If desired by them arrangements can easily be made to send a few consignments of average South African clips as an experiment.

Now that the tariff on the importation of wool into the United States of America has been reduced, it is trusted that the American buyers will direct *their* attention to South Africa. The improvement which has taken place in quality and in the manner in which our wools are marketed will not disappoint them.

From the attached statement, No. 4, which has been taken over from the Trade Returns of the Union Customs and Excise Department, will be seen the advance which has taken place in our wool export trade, and it will be observed that the value of our wool has increased from 6d. to 7d. per pound in five years. The latter fact is no doubt due to the better prices which are being obtained by our farmers for their wool on account of the improvements which have taken place in the flocks generally, and the making up of and marketing of their wool.

REDUCTION IN FREIGHT ON PRESSED WOOL.

The reduction in freight which has been granted by the Conference Shipping lines on wool which has been pressed in accordance with Australian methods is greatly appreciated and will, to a large extent, encourage the pressing of wool. Of course, whilst farmers continue getting the same prices for their wool from local buyers which they have been accustomed to receive for several years now, they will not in any way reap any benefit. It is only the farmer who ships direct to Europe who will benefit.

An endeavour is being made to induce the Railway Authorities to give a reduced rate for pressed wool. In view of the fact that twice as much pressed as unpressed wool can be loaded in a truck and that a large number of trucks would, in consequence, be freed for other traffic, there appears to be no reason why the Railway Department should not agree to the granting of a reduced rate. As the American Buyers will not look at wool which has not been pressed, no efforts should be spared to induce farmers to meet their wishes, and it is thought a reduced railway rate is most likely to bring this about.

EXHIBIT OF SOUTH AFRICAN PRODUCTS.

It having been decided to establish a permanent exhibit of South African products at the office of the Trades Commissioner in London, this Division communicated with leading sheep farmers throughout the Union with a view to obtaining their co-operation and assistance in the collection of the following articles for inclusion therein:—

- (a) Fleeces of wool from :
 - 1. purebred imported Merino Stud Ram;
 - 2. purebred Merino types (South African bred);
 - 3. Merino lambs' wool;
 - 4. cross breeds (any variety);
- (b) Skins of crossbred sheep,
- (c) Goat skins, including Angora and large boer goat skins,

The breeders who were approached responded most willingly to the request made, with the result that it was possible to despatch good representative samples. It is desired to thank the gentlemen concerned for their kind assistance, and the specimens they presented for the abovementioned purpose.

ANGORAS AND MOHAIR.

The Angora Industry has made good progress during the period under review. The number of Angora Goats has increased to the extent of 119,766 which, in view of the severe drought experienced by the districts in which Angoras are largely reared, is most satisfactory.

The increase in the demand for Mohair is no doubt due to the change of fashion and an increased demand for fabrics known as Astrachans and Furs, which are becoming very fashionable in America and Russia.

America imported recently £12,963 worth of Mohair, as shown in the Bradford list of shipments to America for January, whereas a year ago there was no export at all. There is every indication that the Mohair trade is going to be a big and lasting one.

Something should, therefore, be done to assist in the improvement of the Angoras in the Union, on the same lines as are being done for the Sheep and Wool Industry.

DROUGHT.

The drought, through which the Cape has gone is the most severe and longest known to have been suffered in South Africa.

The drought of 1862 was always regarded as a record one, but from what can be gathered by men who have gone through both, the 1912 has eclipsed that of 1862. The losses of sheep (as will be seen from statement Number Two) have been very great.

Of the total of 2,000,647 lost, 1,570,346 were lost in the Cape, 76,989 in the Transvaal, 335,547 in the Orange Free State and 17,767 in Natal. The following are the districts which suffered the most:—

Aberdeen,	Hoopstad,	Rouxville,
Barkly West,	Smithfield.	Klipriver,
Carnarvon,	Albert,	Barkly East,
Fraserburg,	Beaufort West,	Calvinia,
Hanover,	Colesberg.	Craddock.
Hopetown,	Glen Grey,	Graaff-Reinet,
Kingwilliamstown,	Hay,	Herbert,
Middelburg,	Jansenville,	Kenhardt,
Philipstown,	Laingsburg.	Namaqualand,
Richmond,	Murraysburg,	Prince Albert,
Sutherland,	Preiska,	Stutterheim,
Willowmore,	Somerset East.	Victoria West,
Idutywa,	Tarka.	Kuruman,
Engcobo,	Gordonia,	Elliot,
Matatiele.	Tsomo.	Umtata,
Tsolo,	St. Marks,	Qumbu,
Bloemfontein,	Mount Currie.	Bethulie,
Fauresmith.	Standerton,	Edenburg,
Jacobsdal.	Boshof.	
Vrede,	Heilbron,	

There is no doubt that a large number of losses are entirely due to overstocking and to no provision being made for bad seasons.

In almost every case where farmers have taken the precaution to provide for the dry and cold seasons, very little, if any loss, has been suffered.

It is feared too little is yet done in the fencing of farms into paddocks, the growing of winter grasses, lucerne, etc.

LOSSES FROM DISEASE.

The estimated losses from disease in the different Provinces are as follows:

Cape	...	...	...	...	375,989	Sheep and Goats.
Transvaal	...	...	...	...	96,125	Sheep and Goats.
Orange Free State	...	...	...	...	245,217	Sheep and Goats.
Natal	...	...	...	...	28,653	Sheep and Goats.

The disease from which the above animals died are principally Geilziekte, Blue Togue, Wire Worm, and Heartwater.

A large number of the above deaths could undoubtedly have been prevented if proper remedies and preventives had been used. It is regretted that farmers do not sufficiently consult the Government Veterinary Surgeons and use the remedies prepared by the Bacteriological Division of the Department.

ERMELO STUD FARM.

The control of this farm has been given to this Division since the commencement of 1912, and Mr. A. G. Michiaelian, formerly Assistant Sheep and Wool Expert, has been appointed Manager thereof, in the place of Mr. Jacobsz, who has been transferred to the Western Transvaal as a Senior Sheep Inspector.

By careful mating and culling, the flocks of Tasmanians and Wanganellas on this farm are becoming a very high standard, and some excellent rams have been bred during the last couple of years.

The farm is looking well, and the stock are in good condition. The Manager's report for the year is appended hereto. (Statement Five)..

CONCLUSION.

In conclusion, it is desired to express appreciation of the kindly assistance rendered to the Division by Officials of other Departments of State and of the loyal co-operation and support of the field staffs of this Division (more particularly those of Mr. Davison, the Principal Sheep Inspector) who have at all times striven earnestly to carry out the duties assigned to them—in some instances in the face of adverse public criticism. That a certain success has been achieved in the campaign against scab and in the improvement of the Sheep and Wool Industry is due, in no small measure, to the efforts of the district officials.

Our acknowledgments are also due to the New South Wales Department of Agriculture for their kindness in preparing for exhibition purposes photographs of typical Australian Merino Sheep and to the Principal Veterinary Surgeons of Basutoland, Swaziland and Bechuanaland Protectorate for their co-operation in matters relating to scab.

The correspondence entailed in administering the Scab Law and attending to the enquiries and needs of sheep farmers has been very heavy indeed. In all no less than 27,424 letters and telegrams were received, and 20,500 letters and 39,903 circulars and telegrams were despatched during the period under review and, having regard to the fact that the Office has been understaffed since its inception, this record would be incomplete without a reference to the clerks employed, who voluntarily worked overtime on many occasions in order to keep the work going.

The matter of staffing is receiving the attention of the Public Service Commissioners and existing defects in this direction will doubtless be remedied before long.

The organization of the field staffs is now practically complete and initial difficulties and errors having been overcome it is hoped to report a greater measure of progress during the coming year.

B. G. ENSLIN,
Chief, Division of Sheep.

STATEMENT No. 1.

Name of Senior Sheep Inspector.	Names of Districts under his control.	No. of Inspectors under his control.	No. of Flocks.	No. of Small Stock.	No. of square miles of area.	Remarks
W. J. van der Merwe ..	Abberden, Graaff-Reinet, Jansenville, Murraysburg, Steytlerville, Willowmore.	10	4,036	2,266,031	13,457	
W. L. Currie ..	Albany, Alexandria, Bathurst, Cathcart, East London, Adelaide, Fort Beaufort, Stockenström, Kingwilliamstown, Komgha, Peddie, Stutterheim, Victoria East.	15	4,555	1,872,468	9,586	
J. C. Froneman ..	Aliwal North, Barkly East, Herschel, Wodehouse.	11	6,163	2,133,309	5,196	
F. P. Fincham ..	Albert, Glen Grey, Molteno, Queenstown, Steynsburg, Tarka.	12	8,248	2,496,575	7,852	
P. J. de Wet (Griquatown) ..	Barkly West, Hay, Herbert, Kimberley, Hope-town.	11	5,036	1,670,306	18,301	
W. J. Smuts ..	Bredasdorp, Caldon, Cape, Paarl, Stellenbosch, Lainsburg, Ladismith, Riversdale, Swellendam, Malinesbury, Montagu, Fiquetberg, Tulbagh, Robertson, Worcester.	15	5,072	1,891,448	23,213	
S. Keightley ..	Bedford, Cradock, Maraisburg, Port Elizabeth, Pearston, Somerset East, Uitenhage.	12	5,267	2,061,088	10,399	
P. J. de Wet, Beaufort West ..	Beaufort West, Carnarvon, Fraserburg, Victoria West, Williston.	14	3,924	2,297,716	26,864	
W. Cronwright ..	Britstown, Philipstown, Olesberg, Hanover, Middelburg, Richmond.	9	3,665	2,133,476	15,339	
C. A. Wilson ..	Calvinia, Ceres, Clan William, Sutherland ..	9	1,994	1,205,945	25,502	
H. A. van der Merwe ..	Kenhardt, Prieska ..	8	1,923	1,247,421	21,598	
J. H. Louwrens ..	Kuysna, Humansdorp, Prince Albert, Oudtshoorn, George, Uniondale, Mossel Bay.	6	2,455	791,359	12,082	

STATEMENT No. 1.—Continued.

Name of Senior Sheep Inspector.	Names of Districts under his control.	No. of Inspectors under his control.	No. of Flocks.	No. of Small Stock.	No. of square miles of area.	Remarks.
P. A. Steenkamp	Namaqualand, Van Rhyndorp.	7	1,808	610,719	22,562	
G. Venter	Gordonia, Matiking, Vryburg, Kuruman, Taung.	10	7,515	1,138,886	51,522	
F. J. Fuller	Butterworth, Elliot, Engcobo, Idutywa, Kentani, Ngamskwe, St. Mark's, Tsomo, Willowvale.	19	17,780	1,345,849	4,452	
H. F. Brown	Bizana, Elliotdale, Flagstaff, Libode, Lusikisiki, Mqanduli, Ngqeleni, St. John's, Umtata.	15	17,197	675,665	4,726	
B. S. King	Maclear, Matatiele, Mount Ayliff, Mount Currie, Mount Fletcher, Mount Ferec, Quthuba, Tabankulu, Tsolo, Umzinkulu, Nalanga.	24	18,116	1,564,734	8,901	
J. J. C. Ehmatt	Natal and Zululand	25	30,491	2,768,501	25,291	
D. S. Lubbe	Bethulie, Boshof, Edenburg, Fauresmith, Jacobsdal, Philippolis, Rouxville, Smithfield.	17	6,877	3,357,521	15,684	
T. H. Cousins	Bloemfontein, Ficksburg, Hoopstad, Ladybrand, Senekal, Thaba Nchu, Wepener, Winburg.	20	12,593	4,122,960	17,721	
C. Murray	Kroonstad, Vrededorf, Heilbron, Lindley, Bethlehem, Harrisburgh, Vrede, Frankfort.	18	10,542	3,767,695	17,432	
C. J. Brits	Barberton, Bethal, Carolina, Eneldo, Lydenburg, Piet Retief, Standerton, Wakkerstroom.	22	12,110	2,839,059	27,043	
F. P. Jacobsz	Bloemhof, Krugersdorp, Lichtenburg, Marico, Potchefstroom, Rustenburg, Welmaransstad, Johannesburg.	26	8,813	1,502,889	29,737	
P. R. Viljoen	Heidelberg, Middelburg, Pretoria, Waterberg, Zoutpansberg	29	20,103	1,798,463	53,645	

RETURN OF SMALL STOCK IN THE SEVERAL DISTRICTS OF THE UNION ON THE 31-1 DECEMBER, 1912.

Province, Territorial and District.	Total No. of Flocks.	Total No. of Sheep and Goats.				Total No. of Small Stock.	Losses from Diseases.				Total No. of Sheep , and Goats.
		Sheep.		Goats.			Sheep.		Goats.		
		Woolled.	Non-woolled.	Angora.	Others.		Woolled.	Non-woolled.	Angora.	Others.	
<i>Summary.</i>											
Cape Province	64,086	10,403,459	5,551,123	3,539,614	3,183,665	22,677,861	256,934	107,048	46,791	97,111	507,884
Bechuanaland	7,515	234,053	441,757	32,616	430,460	1,138,886	6,241	10,206	694	9,463	26,604
Transkei	11,908	478,921	1,249	13	196,001	676,184	32,421	—	—	20,492	52,913
Tembuland	13,161	853,786	10,877	21,709	221,125	1,107,497	29,489	375	542	9,807	40,213
Griqualand East	14,666	1,023,021	10,376	74,607	264,750	1,372,754	28,578	657	5,461	9,302	43,998
Pondoland	13,358	245,827	6,765	22	177,199	429,813	22,326	500	—	24,983	47,809
GRAND TOTAL FOR CAPE PROVINCE	124,694	13,239,067	6,022,147	3,668,581	4,473,200	27,402,995	375,989	118,786	53,488	171,158	719,421
Transvaal	41,026	3,098,785	1,206,251	189,747	1,665,628	6,160,411	86,125	24,571	4,994	27,967	143,657
Orange Free State	30,012	9,409,656	1,034,266	459,100	345,154	11,248,176	245,217	30,615	7,093	3,900	286,825
Natal	20,471	1,501,813	215,755	76,715	620,587	2,414,870	28,219	2,608	1,118	3,482	35,427
Zululand	10,020	81,846	79,335	958	191,492	353,631	—	434	—	88	522
GRAND TOTAL FOR NATAL	30,491	1,583,659	295,090	77,673	812,079	2,768,501	28,219	3,042	1,118	3,570	35,949
GRAND TOTAL FOR THE UNION	226,223	27,331,167	8,557,754	4,395,101	7,296,061	47,580,083	735,550	177,014	66,693	206,595	1,185,852

RETURN OF SMALL STOCK IN THE SEVERAL DISTRICTS OF THE UNION ON THE 31-1 DECEMBER, 1912. - *Continued.*

Province, Territorial and District.	Losses from Drought.				Total No. of Sheep and Goats.	Increase or Decrease since Census.				Total No. of Sheep and Goats.
	Sheep.		Goats.			Sheep.		Goats.		
	Woolled.	Non-woolled.	Angora.	Others.		Woolled.	Non-woolled.	Angora.	Others.	
<i>Summary.</i>										
Cape Province	440,924	399,058	248,083	153,582	1,241,647	+1,637,970	— 34,196	+ 369,137	— 206,212	+1,766,699
Bechuanaland	2,989	26,158	1,215	22,342	52,704	+ 90,305	+ 39,830	— 18,485	+ 21,680	+133,330
Transkei	36,694	—	—	3,643	40,337	+ 66,734	— 13,784	— 3,978	+ 10,066	+ 59,038
Tembuland	78,034	331	1,052	23,077	102,494	+ 163,308	— 13,226	— 9,855	— 7,678	+132,549
Griqualand East	98,827	213	2,413	10,622	112,075	+ 157,671	— 23,194	— 3,171	+ 14,342	+145,648
Pondoland	12,774	—	—	8,315	21,089	+ 72,146	— 12,600	— 5,199	+ 28,355	+ 82,702
GRAND TOTAL FOR CAPE PROVINCE	670,242	425,760	252,763	221,581	1,570,346	+2,188,134	— 57,170	+ 328,449	— 139,447	+2,319,966
Transvaal	54,064	10,655	3,498	8,770	76,989	+ 768,481	+ 121,305	— 72,427	+ 156,082	+ 973,441
Orange Free State	281,526	40,392	7,442	6,187	335,547	+2,054,604	— 198,320	— 86,477	— 157,840	+1,611,967
Natal	15,765	1,122	350	530	17,767	+ 428,932	— 88,179	— 50,383	— 51,924	+ 238,446
Zululand	—	—	—	—	—	+ 49,704	— 30,966	+ 604	+ 2,171	+ 21,513
GRAND TOTAL FOR NATAL ..	15,765	1,122	350	530	17,767	+ 478,636	— 119,145	— 49,779	— 49,753	+ 259,959
GRAND TOTAL FOR THE UNION ..	1,021,597	477,929	264,053	237,068	2,000,649	+5,489,855	— 253,330	+ 119,766	— 190,958	+5,467,333

RETURN OF SMALL STOCK IN THE SEVERAL DISTRICTS OF THE UNION ON THE 31st DECEMBER, 1912.—(Continued.)

Province, Territorial and District.	Sheep and Goats under order to cleanse on 31st December.		Percentage of Flocks Infected.	Percentage of Sheep and Goats Infected.	No. of Sheep and Goats visibly infected on 31st December.	Percentage of Sheep and Goats visibly Infected.	Stock free from Scab.			Total No. of Sheep- dipping Tanks (permanent and portable).	No. tanks provided during past 12 months (permanent and portable).	
	Flocks.	Sheep and Goats.					Flocks.	Sheep.	Goats.			
Summary.												
Cape Province	1,186	650,050	1.85	2.86	8,400	.03	62,900	15,454,582	6,573,229	13,270	2,048	
Bechuanaland	760	121,753	10.11	10.69	3,117	.27	6,755	612,391	404,742	502	232	
Transkei	208	27,302	1.74	4.03	1,872	.27	11,700	455,712	193,170	151	11	
Tembuland	876	112,845	6.65	10.18	7,661	.69	12,285	773,522	221,130	431	33	
Griqualand East	215	56,212	1.46	4.09	1,034	.07	14,451	980,183	336,359	563	94	
Pondoland	520	32,836	3.89	7.63	4,389	1.02	12,838	226,354	170,623	162	2	
GRAND TOTAL FOR CAPE PROVINCE	3,765	1,000,998	3.01	3.65	26,473	.09	120,929	18,502,744	7,899,253	15,079	2,438	
Transvaal	335	126,455	.81	2.05	2,269	.03	40,691	4,185,267	1,847,689	4,127	1,242	
Orange Free State	744	388,653	2.47	3.45	3,969	.03	29,268	10,074,194	785,329	9,072	452	
Natal	96	25,725	.46	1.06	870	.03	20,375	1,695,226	693,919	1,532	413	
Zululand	132	18,069	1.31	5.10	988	.27	9,888	144,927	190,638	65	8	
GRAND TOTAL FOR NATAL ..	228	43,794	.74	1.58	1,858	.06	30,263	1,840,153	884,557	1,597	421	
GRAND TOTAL FOR THE UNION..	5,072	1,559,900	2.24	3.27	34,569	.07	221,151	34,602,358	11,416,828	29,875	4,573	

RETURN OF SMALL STOCK IN THE SEVERAL DISTRICTS OF THE UNION ON THE 31ST DECEMBER, 1912.—Continued.

Districts.	Total No. of Flocks.	Total No. of Sheep and Goats.				Losses from Diseases.				Total No. of Sheep and Goats.
		Sheep.		Goats.		Sheep.		Goats.		
		Woolled.	Non-woolled.	Angora.	Others.	Woolled.	Non-woolled.	Angora.	Others.	
CAPE PROVINCE.										
Aberdeen ..	688	37,662	62,472	300,689	7,579	229	375	1,645	—	2,249
Adelaide ..	500	59,537	18,701	16,049	5,304	225	2,820	—	—	3,045
Albany ..	663	69,537	46,902	565	34,934	3,312	2,274	83	2,302	7,971
Albert ..	915	442,644	77,660	15,270	4,889	6,945	2,900	77	93	10,015
Alexandria ..	208	860	17,044	—	6,918	112	1,597	—	824	2,533
Aliwal North ..	947	379,920	48,042	12,968	960	3,110	—	—	—	3,110
Barkly East ..	1,197	741,131	8,178	2,252	2,635	17,800	37	—	14	17,851
Barkly West ..	1,845	158,968	86,059	28,498	86,716	15,990	8,265	1,530	6,684	32,469
Bathurst ..	122	527	2,826	—	3,694	8	121	—	203	332
Beaufort West ..	928	199,258	185,963	149,277	76,265	2,382	1,792	1,926	129	6,229
Bedford ..	865	201,982	43,760	111,426	15,277	—	—	210	—	210
Bredasdorp ..	381	178,323	1,189	3,015	4,518	1849	—	—	—	1,849
Bristown ..	660	161,350	129,670	56,426	35,200	250	—	—	—	250
Caledon ..	337	192,446	—	—	3,167	2,815	—	—	—	2,815
Calvinia ..	883	165,678	381,912	4,050	150,025	—	400	50	18	600
Cape ..	104	26,922	1,272	—	3,198	253	20	—	20	293
Carnarvon ..	1,067	95,616	324,125	37,683	98,349	1,490	3,316	318	2,183	7,307
Cathcart ..	702	344,339	4,541	8,458	5,463	11,392	291	433	558	12,674
Ceres ..	277	86,243	37,591	—	18,743	—	—	—	—	—
Clanwilliam ..	509	36,360	23,445	300	88,509	1,379	1,016	20	3,749	6,164
Colesberg ..	688	306,845	76,437	30,251	16,213	1,213	80	—	14	1,307
Craddock ..	1,579	170,208	218,062	268,705	17,783	1,364	1,425	2,284	15	5,088
East London ..	1,165	5,288	7,985	—	30,567	389	751	—	3,485	4,625
Fort Beaufort ..	545	92,688	20,020	5,640	13,118	3,038	—	—	746	3,784
Fraserburg ..	1,153	59,612	465,748	18,717	143,700	295	6,508	102	3,603	10,501
George ..	209	43,083	3,361	1,107	17,166	1,600	—	4	247	1,851
Glen Grey ..	3,631	218,112	18,913	18,699	69,508	977	43	—	—	1,020
Graaff-Reinet ..	843	193,116	79,371	203,568	30,079	4,041	1,000	5,216	1,000	11,257
Hanover ..	486	156,256	46,341	50,941	5,973	—	—	—	—	—
Hay ..	1,185	99,960	190,416	42,293	209,201	7,650	14,010	1,715	9,219	32,594
Herbert ..	1,002	63,281	129,297	23,464	92,292	3,220	7,746	1,787	6,255	19,008
Herschel ..	2,232	135,118	26,073	41,834	47,343	5,656	583	621	1,371	8,231
Hopetown ..	601	122,868	151,587	22,958	30,278	3,723	7,441	530	1,149	12,843
Hunamondy ..	562	101,738	16,959	1,501	21,432	2,771	334	37	657	3,796

	986	10,209	36,909	422,676	65,790	535,584	—	77	7 4	20	861
Jansenville	1,253	23,695	526,178	8,511	177,791	736,175	11	6,639	115	2,787	9,552
Kenhardt	383	36,679	59,231	8,034	28,316	132,260	510	2,310	315	725	3,860
Kimberley	5,640	263,662	5,596	391	130,948	400,597	24,071	700	53	13,073	37,897
Kingwilliamstown	83	14,935	39	86	2,740	17,800	458	—	—	53	511
Krystna	1,080	71,813	7,663	—	37,746	117,222	2,917	678	—	1,500	5,095
Kongha	301	1,242	21,636	—	94,358	117,236	—	—	—	—	—
Ladismith	365	28,871	107,889	90	72,080	209,621	96	2,471	16	1,824	4,407
Laingsburg	844	250,556	1,448	—	30,867	282,871	2,127	—	—	449	2,576
Maibesbury	590	141,324	121,885	45,252	17,631	326,092	725	511	40	—	1,276
Middelburg	590	284,192	8,000	3,030	160	295,82	—	—	—	—	—
Molteno	115	1,483	24,364	—	27,366	53,213	—	—	—	—	—
Montagu	373	101,998	355	37	17,959	120,349	3,018	—	6	1,076	4,100
Mossel Bay	437	58,226	36,522	152,977	3,731	251,456	3,659	1,364	3,509	225	7,757
Murraysburg	1,377	6,451	242,844	80	166,575	415,950	70	7,889	—	8,461	16,420
Namaqualand	590	—	17,316	—	53,943	71,259	—	—	—	—	—
Naudishoorn	239	37,533	2,747	—	9,859	50,139	416	60	—	25	501
Paarl	1,646	48,483	3,072	—	49,869	101,424	5,636	—	—	1,016	6,652
Peddie	505	241,921	83,936	42,611	20,848	389,316	—	—	—	—	—
Philpstown	535	111,366	4,136	78	54,984	170,564	3,752	263	—	807	4,822
Piquetberg	221	—	2,212	—	4,058	6,270	—	50	50	—	50
Port Elizabeth	670	69,003	300,989	—	107,654	511,246	1,545	5,712	615	3,036	10,908
Prieska	300	53,357	108,677	30,475	57,216	249,725	—	224	726	726	950
Prince Albert	1,774	602,021	7,628	47,990	18,081	675,720	21,653	327	2,383	721	25,084
Queenstown	736	191,082	43,355	94,201	17,527	346,165	—	—	—	—	—
Richmond	627	163,410	3,960	1,097	42,170	210,637	—	—	—	—	—
Riversdale	135	2,183	9,633	—	15,590	27,316	—	—	—	—	—
Robertson	1,558	156,245	175,064	443,027	42,807	817,143	4,542	3,725	6,457	1,995	16,719
Somerset East	80	8,741	1,588	347	3,542	14,218	102	20	—	—	122
Stellenbosch	575	187,543	45,014	10,637	3,948	249,142	4,601	347	78	—	5,026
Steynsburg	506	1,910	26,750	221,712	22,440	272,812	—	—	2,730	—	2,730
Steylerville	380	72,374	9,000	8,188	15,453	105,015	1,561	—	—	924	2,485
Stockenström	765	232,510	2,036	400	10,606	245,552	10,964	79	—	594	11,637
Stutterheim	325	66,250	105,927	700	40,212	213,089	60	130	—	—	190
Sutherland	663	193,830	12,969	14,103	30,069	250,971	1,047	—	350	—	1,397
Swellendam	763	309,419	30,102	65,820	5,295	410,636	11,800	831	2,798	33	15,462
Tarka	88	11,188	1,095	—	2,983	15,266	—	—	—	—	—
Tulbagh	1,044	17,574	27,664	89,423	55,811	190,472	572	1,173	2,002	2,611	6,358
Uitenhage	338	35,302	17,076	33,716	39,785	125,879	756	113	420	424	1,713
Uniondale	431	22,563	114,672	—	57,444	194,679	823	594	—	2,425	3,842
Van Rhynsdorp	1,159	45,119	8,362	1,825	25,847	81,153	8,260	1,449	274	5,113	15,096
Victoria East	776	209,963	129,342	63,140	40,958	443,403	250	447	400	121	1,218
Victoria West	576	11,024	48,984	193,622	38,013	291,643	246	1,920	3,493	1,402	7,061
Willowmore	1,727	637,612	21,921	24,434	2,888	686,855	35,938	813	1,385	72	38,208
Wodehouse	257	21,121	33,424	—	20,801	75,346	270	990	—	185	1,445
Worcester	—	—	—	—	—	—	—	—	—	—	—
Total	64,086	10,403,459	5,551,123	3,539,614	3,183,665	22,677,861	256,934	107,048	46,791	97,111	507,884

Eastonville	260	815	14,759	2,061	18,015	5,206	5,192	-	108,689	+	3,023	+ 122,110
Kenhardt	1,598	28,963	721	10,485	41,767	6,015	1,448	+	3,683	-	33,072	- 29,292
Kimberley						94	4,094	+	906	-	8,905	- 5,811
Krugwillamstown ..	23,202	4,407	49	4,965	32,623	62,878	19,262	-	1,670	-	38,859	+ 80,805
Knysna						192	236	-	168	-	180	- 776
Komgha	1,262				1,262	31,347	82	+	287	-	6,493	+ 37,635
Laati-muth	2,655					1,161	4,794	+	10	+	26,048	+ 31,993
Lansburg						3,631	4,263	+	225	+	1,949	+ 6,020
Malmesbury		15,648		3,057	21,360	64,110	1,807	-	9	-	4,826	+ 57,468
Middelburg	13,949	14,156	5,453	1,000	34,558	12,429	12,941	-	2,230	-	10,692	- 13,434
Molteno	3,780				3,780	117,886	18,062	-	3,425	-	2,510	+ 93,889
Montagu						2,000	848	-	30	-	1,230	- 4,108
Mossel Bay						16,461	347	-	61	-	260	+ 15,793
Murraysburg	6,016	3,178	15,672	565	25,431	1,014	6,311	-	9,434	+	9,813	+ 5,676
Namaqualand	493	19,005		6,191	25,689	2,321	31,437	+	249	+	1,916	+ 30,783
Oudtshoorn						1,196	4,868	+	880	-	197	+ 2,595
Paarl						13,556	1,163	-	160	+	1,193	+ 13,426
Peddie						18,442	3,633	-	266	+	11,758	+ 26,301
Philipstown	14,862	2,661	1,678	774	19,975	67,921	25,225	+	13,724	-	283	+ 106,587
Phoketberg						9,643	2,244	+	302	-	2,022	+ 5,075
Port Elizabeth						1,027	1,783	-	210	+	174	- 2,846
Prinska	7,249	19,972	1,689	5,714	34,624	8,758	12,356	-	29,407	-	6,813	- 39,818
Prince Albert	1,958	4,590	1,416	2,242	10,206	24,197	22,871	+	12,626	+	179	+ 59,873
Queenstown	1,560	20	453	390	2,835	118,807	9,105	-	440	-	625	+ 108,637
Richmond	27,304	3,662	9,761	2,671	42,798	40,102	397	+	26,865	-	4,104	+ 63,260
Riversdale						21,768	472	-	217	-	1,103	+ 20,410
Robertson						356	3,553	-	5	-	7,036	- 10,238
Somerset East	3,600	4,965	23,116	251	31,932	29,391	34,677	+	83,610	-	20,533	+ 127,145
Stellenbosch						1,644	785	-	74	+	81	+ 866
Steynsburg	5,599	482	300		6,381	36,789	635	-	217	-	1,475	+ 34,462
Steyterville			4,530		4,530	896	7,685	+	33,679	+	1,275	+ 40,982
Stockenström						2,313	1,743	-	2,829	-	1,269	- 3,528
Sutherland	18,360				18,360	13,598	3,062	-	804	-	5,995	- 23,369
Swartland	10,380	27,737		2,200	40,407	20,200	33,093	+	254	-	3,410	- 16,043
Swellendam						42,026	303	-	836	-	4,253	+ 38,306
Tarka	7,694	553	6,478	9	14,734	31,037	2,783	-	10,577	-	3,679	+ 13,998
Tulbagh						1,573	1,267	-		-	2,335	- 2,029
Uitenhage			2,000		2,000	1,701	1,294	+	16,843	+	1,776	+ 18,062
Uniondale				1,116	1,116	5,390	8,297	+	9,877	+	13,093	+ 36,657
Van Rhynsdorp	1,882	2,457		1,022	5,361	6,515	47,761	+	17	-	16,161	+ 38,098
Victoria East						14,182	709	+	833	-	2,208	+ 13,516
Victoria West	25,285	12,276	7,307	3,858	48,726	26,360	40,801	-	+	+	5,754	- 10,123
Willowmore	180	1,573	7,833	1,005	10,591	228	62	+	19,200	-	5,241	+ 13,793
Wodehouse	2,100				2,100	110,789	17,273	+	567	-	3,226	+ 89,723
Worcester	150	290		60	500	397	569	-	85	-	1,877	- 2,134
Total	440,924	399,058	248,083	153,382	1,241,647	+ 1,637,970	34,196	-	+ 369,137	-	-206,212	+ 1,766,699

RETURN OF SMALLSTOCK IN THE SEVERAL DISTRICTS OF THE UNION ON THE 31ST DECEMBER, 1912.—Continued.

Districts.	Sheep and Goats under order to cleanse on 31st December.		Percentage of Flocks Infected.		Percentage of Sheep and Goats Infected.		No. of Sheep and Goats visibly infected on 31st December.		Percentage of Sheep and Goats visibly infected.		Stock free from Scab.		Total No. Portable Tanks.		Total No. Permanent dipping Tanks.		No. tanks provided during past 12 months (permanent and portable).	
	Flocks.	Sheep and Goats.	Flocks.	Infected.	Flocks.	Infected.	Flocks.	Infected.	Flocks.	Infected.	Flocks.	Sheep.	Goats.	Flocks.	Sheep.	Goats.	Flocks.	Sheep.
CAPE PROVINCE.																		
Aberdeen	49	22,965	7.13	5.62	139	0.034	639	95,084	290,553	2	201	26						
Adelaide	1	100	0.02	0.40	4	0.004	499	77,838	21,353	1	63	7						
Albany	1	419	0.15	0.28	4		662	116,439	35,080	22	172							
Albert	19	11,226	2.08	2.08	60	0.011	896	509,396	19,841	3	443	27						
Alexandria										30	41	2						
Alwal North	24	15,632	2.64	3.54	126	0.027	923	412,407	13,851	1	232	15						
Barkly East	58	35,225	4.84	4.94	189	0.025	1,139	714,151	4,820		264	51						
Barkly West	16	6,545	0.87	1.82	192	0.054	1,829	239,838	113,858	12	127	29						
Bathurst							122	3,353	3,094	5	17							
Beaufort West	28	14,939	3.02	2.45	220	0.036	900	375,388	220,436		256	23						
Bedford							865	243,742	126,703	1	176	2						
Bredasdorp	2	1,493	0.30	0.39	4		381	179,512	7,533	13	115	23						
Britstown	4	1,854	1.19	0.95	11	0.006	658	289,567	91,586	1	171	34						
Calcutta	71	45,329	8.04	6.46	1,060	0.151	333	190,635	3,124		207	46						
Calvinia			0.96	0.12	6	0.019	812	509,543	146,793	28	135	34						
Cape	1	37	6.55	7.89	126	0.023	103	28,157	3,198	6	60	37						
Carnarvon	70	43,870	0.16	0.22	5	0.023	997	385,169	126,734		199	65						
Cathcart	1	800	6.11	0.22	271	0.180	701	348,080	13,921		175	8						
Ceres	17	10,115	0.39	0.29	8	0.004	260	115,071	17,391	36	102	53						
Clanwilliam	2	430	0.39	0.29	18	0.004	507	59,475	88,709	31	152	38						
Collesberg	4	2,292	0.58	0.53	285	0.042	684	381,026	46,428	14	233	19						
Crooket	45	28,604	2.85	4.29	285	0.042	1,534	372,396	273,758	5	372	61						
East London			0.55	1.14	6	0.076	1,165	13,273	30,567		103	3						
Fort Beaufort	3	1,502	8.53	8.09	524	0.076	542	111,206	18,758	2	34	3						
Fraserburg	96	55,650	1.98	2.47	629	0.007	1,057	482,766	149,361		255	77						
George			0.83	0.97	36	0.007	209	46,444	18,273		56	1						
Glen Grey	72	8,026	0.83	0.97	36	0.007	3,559	230,405	86,801	3	85	5						
Graaff-Reinet	7	4,906	1.03	1.09	3	0.001	836	268,601	232,627	5	208	7						
Hanover	5	2,839	2.62	3.48	142	0.026	481	200,282	56,390		126	1						
Hay	31	18,841	0.90	1.89	40	0.013	1,154	286,399	242,630	3	278	44						
Herbert	9	5,839	1.33	1.45	91	0.028	993	186,900	115,595	4	174	40						
Herschel			0.53	0.34	30	0.021	2,232	161,191	89,177	16	53							
Hopetown	8	4,750	1.33	1.45	91	0.028	593	270,695	52,246	9	191	47						
Humansdorp	3	484	0.53	0.34	30	0.021	559	118,437	22,709	23	140	47						

RETURN OF SMALL STOCK IN THE SEVERAL DISTRICTS OF THE UNION ON THE 31ST DECEMBER, 1912.

Districts.	Flocks.	Total Number of Sheep and Goats.				Total Number Small Stock.	Losses from Diseases.				Total.	
		Sheep.		Goats.			sheep.		Goats.			
		Woolled.	Non-woolled.	Angora.	Others.		Woolled	Non-woolled.	Angora.	Others.		
BECHUANALAND.	..	1,019	2,646	192,371	3,629	117,763	316,409	21	6,916	158	5,616	12,711
	..	2,529	52,185	89,061	10,668	124,083	275,997	—	—	—	—	—
	..	1,047	29,978	54,057	3,026	55,437	142,498	60	—	50	20	130
	..	2,920	149,244	106,268	15,293	133,177	403,982	6,160	3,290	486	3,827	13,763
	TOTAL ..	7,515	234,053	441,757	32,616	430,460	1,138,886	6,241	10,206	694	9,463	26,604
TRANSKEI.	..	1,562	67,642	—	13	19,886	87,541	4,888	—	—	1,179	6,067
	..	1,843	124,840	—	—	29,867	154,707	7,340	—	—	5,000	12,340
	..	1,717	44,900	17	—	35,494	80,411	690	—	—	995	1,685
	..	2,994	165,775	—	—	40,128	205,903	14,641	—	—	5,277	19,918
	..	1,264	39,994	1 232	—	33,558	74,784	3,590	—	—	—	3,590
..	2,528	35,770	—	—	37,068	72,838	1,272	—	—	—	9,313	
TOTAL ..	11,908	478,921	1,249	13	196,001	676,184	32,421	—	—	—	20,492	52,913
TEMBULAND.	..	651	238,708	2,232	6,682	1,840	249,462	5,250	51	195	23	5,519
	..	1,890	26,801	—	—	34,733	61,534	584	—	—	855	1,439
	..	2,947	159,450	1,244	2,228	51,614	214,536	6,194	221	112	1,562	8,089
	..	1,969	61,397	—	—	25,416	86,813	3,075	—	—	1,230	4,305
	..	2,274	146,248	2,085	1,007	56,327	205,667	6,723	—	—	3,500	10,223
..	2,518	168,009	—	—	36,543	204,552	6,600	—	—	2,350	8,950	
..	912	53,173	5,316	11,792	14,652	84,933	1,063	103	235	287	1,688	
TOTAL ..	13,161	853,786	10,877	21,709	221,125	1,107,497	29,489	375	542	9,807	40,213	
GRICQUALAND EAST.	..	438	103,233	2,336	8,172	6,190	119,931	2,752	157	351	373	3,633
	..	2,021	214,575	1,187	14,837	31,446	262,045	5,343	13	161	110	5,627
	..	1,136	32,289	—	—	29,173	61,462	684	—	—	1,158	1,842
	..	516	232,534	2,298	573	5,615	241,020	2,439	56	7	345	2,847
	..	1,474	84,627	3,557	43,576	29,426	161,186	6,417	379	4,931	2,364	14,091
..	2,133	74,721	—	—	43,059	117,780	1,120	—	—	—	1,610	
..	2,776	115,317	—	6,218	42,596	164,131	5,902	—	—	2,414	8,316	
..	2,240	93,269	—	139	34,034	127,442	1,747	—	5	768	2,520	
..	1,932	72,456	998	1,092	43,211	117,757	2,174	52	6	1,280	3,512	
TOTAL ..	14,666	1,023,021	10,376	74,607	264,750	1,372,754	28,578	657	5,461	9,302	43,998	
PONDOLAND (EAST AND WEST).	..	2,564	27,914	6,765	22	28,650	63,351	600	500	—	1,500	2,600
	..	1,207	17,009	—	—	10,373	27,382	1,700	—	—	3,500	5,200
	..	2,046	58,171	—	—	27,385	85,556	2,582	—	—	3,593	6,175
	..	2,358	30,718	—	—	30,702	61,420	1,920	—	—	2,600	4,520
	..	1,812	43,478	—	—	20,490	63,968	4,279	—	—	3,060	7,339
..	833	1,971	—	—	19,118	21,089	300	—	—	1,325	1,625	
..	2,538	66,566	—	—	40,481	107,047	10,945	—	—	9,405	20,350	
TOTAL ..	13,358	245,827	6,765	22	177,199	429,813	22,326	500	—	24,983	47,809	

Districts.	Losses from Drought.					Total.	Increase or Decrease since Census.					Total.
	Sheep.		Goats.				Sheep.		Goats.			
	Woolled.	Non-woolled.	Angora.	Others.	Total.		Woolled.	Non-woolled.	Angora.	Others.	Total.	
BECHUANALAND.												
Gordonia ..	120	12,054	201	10,228	22,603	—	955	+ 11,180	+ 1,548	— 5,272	+ 6,501	
Kuruman ..	2,000	10,000	1,000	10,000	23,000	—	2,205	+ 6,154	— 2,516	— 1,223	+ 4,620	
Mafeking ..	—	—	—	—	—	—	14,315	+ 11,391	— 5,644	+ 5,057	+ 25,119	
Vryburg ..	869	4,104	14	2,114	7,101	—	74,740	+ 11,105	— 11,873	+ 23,118	+ 97,090	
TOTAL ..	2,989	26,158	1,215	22,342	52,704	—	90,305	+ 39,830	— 18,485	+ 21,680	+ 133,330	
TRANSKEI.												
Butterworth ..	4,735	—	—	—	4,735	—	14,743	— 2,306	— 161	— 1,809	+ 10,467	
Idutywa ..	12,064	—	—	200	12,264	—	11,446	— 2,127	— 801	+ 5,210	+ 13,728	
Kentani ..	3,275	—	—	43	3,318	—	10,768	— 2,471	— 246	+ 1,014	+ 9,065	
Nqamakwe ..	3,850	—	—	800	4,650	—	23,504	— 710	— 1,883	+ 3,207	+ 24,118	
Tsomo ..	10,770	—	—	—	10,770	—	1,904	— 4,000	— 82	— 958	— 6,944	
Willowvale ..	2,000	—	—	2,600	4,600	—	8,177	— 2,170	— 895	+ 3,402	+ 8,604	
TOTAL ..	36,694	—	—	3,643	40,337	—	66,734	— 13,784	— 3,978	+ 10,066	+ 59,038	
TEMBULAND.												
Elliot ..	11,801	—	—	—	11,801	—	48,969	— 4,394	— 4,297	— 1,346	+ 38,932	
Elliotdale ..	—	—	—	—	—	—	24,010	— 1,874	— 80	+ 18,164	+ 40,220	
Engcobo ..	18,110	126	832	8,767	27,835	—	20,982	— 8,070	— 1,003	— 19,784	+ 7,875	
Mqanduli ..	—	—	—	—	—	—	7,147	— 981	— 246	— 2,721	+ 3,199	
St. Mark's ..	12,302	205	220	11,451	24,178	—	40,069	— 105	+ 184	+ 998	+ 41,146	
Umtata ..	35,821	—	—	2,859	38,680	—	14,607	— 389	— 180	+ 6,561	+ 7,477	
Xalanga ..	—	—	—	—	—	—	7,524	+ 2,587	— 4,233	+ 3,572	+ 9,450	
TOTAL ..	78,034	331	1,052	23,077	102,494	—	163,308	— 13,226	— 9,855	— 7,678	+ 132,549	
GRICUALAND EAST.												
Maclear ..	3,780	102	441	374	4,697	—	7,866	— 1,153	— 1,414	— 2,245	+ 3,054	
Matatiele ..	14,885	5	402	224	15,516	—	22,645	— 9,718	— 3,964	+ 4,101	+ 13,064	
Mount Ayliff ..	800	—	—	800	1,600	—	6,344	— 241	— 44	+ 2,010	+ 8,069	
Mount Currie ..	33,135	16	70	290	33,511	—	31,016	+ 1,546	— 588	— 755	+ 31,219	
Mount Fletcher ..	2,000	90	1,500	200	3,790	—	17,676	+ 190	+ 4,457	+ 9,235	+ 31,558	
Mount Frere ..	5,055	—	—	3,325	8,380	—	9,752	— 2,641	— 1,632	+ 5,369	+ 110	
Qumbu ..	13,113	—	—	998	14,111	—	40,953	— 6,436	+ 1,637	+ 4,770	+ 40,924	
Tsolo ..	24,128	—	—	4,411	28,539	—	8,356	— 938	— 1,113	— 10,523	— 4,218	
Umtinkulu ..	1,931	—	—	—	1,931	—	13,063	— 3,803	— 510	+ 13,118	+ 21,868	
TOTAL ..	98,827	213	2,413	10,622	112,075	—	157,671	— 23,194	— 3,171	+ 14,342	+ 145,648	
PONDOLAND (EAST AND WEST).												
Bizana ..	—	—	—	—	—	—	11,268	+ 2,945	— 106	+ 9,833	+ 23,940	
Flagstaff ..	—	—	—	—	—	—	1,363	— 529	— 75	+ 3,285	+ 2,526	
Libode ..	3,800	—	—	853	4,653	—	19,310	— 8,329	— 3,515	+ 1,390	+ 8,856	
Lusikisiki ..	—	—	—	—	—	—	18,013	— 2,269	— 90	+ 13,833	+ 29,487	
Nqgeleni ..	3,764	—	—	1,762	5,526	—	14,181	— 2,481	— 172	+ 1,627	+ 13,155	
St. John's ..	600	—	—	2,650	3,250	—	1,520	— 829	— 82	+ 9,027	+ 9,636	
Tabankulu ..	4,610	—	—	3,050	7,660	—	6,491	— 1,108	— 1,159	— 4,070	+ 154	
TOTAL ..	12,774	—	—	8,315	21,089	—	72,146	— 12,600	— 5,199	+ 28,355	+ 82,702	

RETURN OF SMALL STOCK IN THE SEVERAL DISTRICTS OF THE UNION ON THE 31ST DECEMBER, 1912.—Continued.

Districts.	Sheep and Goats under order to cleanse on 31st December.		Percentage of flocks infected.	Percentage of sheep and goats infected.	No. of sheep and goats visibly infected on 31st December.	Percentage of sheep and goats visibly infected.	Stock free from Scab.			Total No. portable dipping tanks.	Total No. permanent dipping tanks.	No. of tanks provided during last twelve months (permanent & portable.)
	Flocks.	Sheep and Goats.					Flocks.	Sheep.	Goats.			
BECHUANALAND.												
Gordonia ..	75	20,190	7.36	6.38	383	0.121	944	182,708	113,511	24	82	55
Kuruman ..	41	21,477	1.62	7.78	464	0.168	2,488	125,465	129,055	1	95	21
Mafeking ..	43	8,281	4.10	5.81	86	0.060	1,004	77,893	56,324	2	94	64
Vryburg ..	601	71,805	20.58	17.77	2,184	0.540	2,319	226,325	105,852	28	176	112
TOTAL ..	760	121,753	10.11	10.69	2,117	0.27	6,755	612,391	404,742	55	447	252
TRANSKEI.												
Butterworth ..	9	1,572	0.59	1.80	23	0.022	1,553	66,084	19,885	6	21	6
Idutywa ..	29	3,610	1.57	2.33	165	0.107	1,814	121,432	29,665	—	23	—
Kentani ..	—	—	—	—	—	—	1,717	44,917	35,494	—	27	—
Nqamakwe ..	144	20,732	4.81	10.07	1,488	0.723	2,850	147,222	37,949	—	37	2
Tsomo ..	25	1,378	1.98	1.84	193	0.258	1,239	40,287	33,119	—	14	—
Willowvale ..	1	10	0.04	—	3	0.004	2,527	35,770	37,058	1	22	3
TOTAL ..	208	27,302	1.74	4.03	1,872	0.27	11,700	455,712	193,170	7	144	11
TEMPULAND.												
Elliott ..	25	11,433	3.84	4.58	132	0.053	626	229,724	8,305	—	180	27
Elliotdale ..	3	162	0.16	0.26	8	0.013	1,887	26,665	34,707	—	4	1
Engcobo ..	418	51,219	14.18	23.86	2,642	1.231	2,529	118,374	44,943	—	80	—
Mqanduli ..	11	1,341	0.56	1.54	50	0.058	1,958	60,307	25,165	—	41	1
St. Mark's ..	366	40,596	16.13	19.74	4,567	2.221	1,908	119,210	45,861	—	46	1
Umtata ..	53	8,094	2.11	3.96	262	0.128	2,465	160,753	35,705	1	46	—
Xalanga ..	—	—	—	—	—	—	912	58,489	26,444	1	32	1
TOTAL ..	876	112,845	6.65	10.18	7,661	0.69	12,285	773,522	221,130	2	429	31
GRIQUALAND EAST.												
Maclear ..	14	8,273	3.19	6.90	46	0.038	424	97,303	14,355	—	109	12
Matatiele ..	32	18,294	1.58	6.98	16	0.006	1,989	197,825	45,926	—	130	22
Mount Ayliff ..	1	181	0.09	0.29	3	0.005	1,135	32,151	29,130	—	15	3
Mount Currie ..	36	16,170	6.98	6.71	29	0.012	480	218,966	5,884	35	89	52
Mount Fletcher ..	1	38	0.07	0.02	7	0.004	1,473	88,151	72,997	13	33	—
Mount Frere ..	60	5,887	2.81	5.00	781	0.663	2,073	69,744	42,149	4	28	—
Qunbu ..	10	847	0.36	0.52	90	0.055	2,766	114,650	48,634	—	31	—
Tsolo ..	61	6,522	2.72	5.12	62	0.049	2,179	87,939	32,981	—	25	2
Umsinkulu ..	—	—	—	—	—	—	1,932	73,454	44,303	—	51	3
TOTAL ..	215	56,212	1.46	4.09	1,034	0.07	14,451	980,183	336,359	52	511	94
PONDOLAND (EAST AND WEST).												
Bizana ..	178	12,284	6.94	19.37	1,477	2.331	2,386	24,633	26,434	—	27	—
Flagstaff ..	41	1,251	3.40	4.57	298	1.085	1,166	16,054	10,077	—	20	—
Libode ..	61	4,432	2.98	5.18	293	0.342	1,985	54,813	26,311	—	27	—
Lusikisiki ..	15	389	0.64	0.63	56	0.091	2,343	30,508	30,523	—	22	—
Ngqeleni ..	120	6,849	6.62	10.71	1,679	2.625	1,692	37,639	19,480	—	28	1
St. John's ..	2	58	0.24	0.28	3	0.014	831	1,971	19,060	—	15	—
Tabankulu ..	103	7,573	4.06	7.07	583	0.545	2,435	60,736	38,738	—	23	—
TOTAL ..	520	32,836	3.89	7.63	4,389	1.02	12,838	226,354	170,623	—	162	2

RETURN OF SMALL STOCK IN THE SEVERAL DISTRICTS OF THE UNION ON THE 31ST DECEMBER, 1912.

Districts.	Total No. of Flocks.	Total No. of Sheep and Goats.				Total No. of Small Stock.	Losses from Diseases.				Total No. of Sheep and Goats.	
		Sheep.		Goats.			Sheep.		Goats.			
		Woolled.	Non-woolled.	Angora.	Others.		Woolled.	Non-woolled.	Angora.	Others.		
TRANSVAAL.												
Barberton	799	1,320	3,270	94	61,284	56,600	21	182	7	203	413	
Bethal	562	205,325	11,771	2,385	239,103	19,622	6,152	422	—	—	6,574	
Bloemhof	923	118,304	99,520	44,851	295,260	32,585	1,292	641	455	187	2,575	
Carolina	824	150,399	13,082	9,944	206,674	33,249	3,152	1,007	505	368	5,032	
Ermelo	1,390	520,100	9,692	1,447	567,959	36,720	21,640	420	4	1,418	23,482	
Heidelberg	1,188	190,181	41,006	7,098	272,092	33,807	1,982	892	43	130	3,047	
Johannesburg, Boksburg and Germiston	312	4,500	16,110	2,000	31,210	8,600	—	—	—	—	—	
Krugerdsorp	446	3,918	26,345	2,065	51,170	18,812	82	650	110	468	1,310	
Lichtenburg	1,190	138,293	125,371	14,399	312,229	33,966	878	970	44	292	2,184	
Lydenburg	4,285	224,303	38,938	21,197	504,152	219,714	5,953	320	1,359	460	8,092	
Marico	745	1,934	46,227	691	89,018	40,166	8	1,389	—	1,245	2,642	
Middelburg	2,879	142,838	65,150	11,915	354,876	134,973	2,023	516	38	358	2,935	
Piet Retief	1,449	77,337	9,759	850	151,519	63,573	3,056	1,119	215	5,108	9,498	
Potchefstroom	1,930	74,883	109,653	20,663	274,000	68,801	778	3,497	1,549	7,037	7,037	
Pretoria	2,980	37,248	132,661	3,828	315,539	142,002	791	3,949	10	2,514	7,264	
Rustenburg	2,468	3,080	73,118	3,199	188,244	108,847	128	4,258	92	5,483	9,961	
Standerton	1,080	403,051	9,396	3,075	441,683	26,161	14,115	74	65	1,151	15,405	
Wakkerstroom	1,721	616,348	5,902	5,275	686,685	59,160	20,490	42	45	1,854	22,431	
Waterberg	2,212	521	77,016	1,359	198,896	120,000	2	694	—	862	1,558	
Wolmaransstad	799	172,629	48,599	29,273	261,758	11,257	3,288	1,015	423	297	5,023	
Zoutpansberg	10,844	12,243	243,665	4,139	657,060	397,013	294	2,514	30	4,356	7,194	
Total	41,026	3,098,785	1,206,251	189,747	6,160,411	1,665,628	86,125	24,571	4,994	27,967	143,657	

RETURN OF SMALL STOCK IN THE SEVERAL DISTRICTS OF THE UNION ON THE 31ST DECEMBER, 1912.—Continued.

Districts.	Losses from Drought.				Total No. of Sheep and Goats.	Increase or Decrease since Census.				Total No. of Sheep and Goats.
	Sheep.		Goats.			Sheep.		Goats.		
	Woolled.	Non-woolled.	Angora.	Others.		Woolled.	Non-woolled.	Angora.	Others.	
TRANSVAAL.										
Barberton	—	—	—	—	—	+ 115	—	—	—	—
Bethal	7,995	99	18	—	8,112	+ 63,368	4,322	692	+ 4,864	35
Bloemhof	3,043	2,612	1,701	262	7,618	+ 16,809	9,677	235	+ 4,740	58,196
Carolina	8,735	208	447	94	9,484	+ 11,146	399	2,244	—	5,583
Ernelo	560	67	—	—	627	+ 118,306	13,843	1,994	—	4,356
Heidelberg	470	31	—	—	501	+ 34,506	13,360	4,257	—	101,130
Johannesburg, Boksburg and Germiston	—	—	—	—	—	—	—	—	—	12,996
Krugerdsdorp	—	337	—	153	490	+ 578	604	44	+ 243	225
Lichtenburg	—	50	—	—	50	+ 1,468	10,016	678	+ 4,046	14,852
Lydenburg	5,700	180	350	523	6,753	+ 68,079	50,929	1,300	+ 319	118,027
Marico	—	100	—	30	130	+ 87,756	1,919	412	+ 34,509	119,934
Middelburg	1,606	570	270	1,089	3,535	—	14,151	1,274	+ 10,207	23,000
Piet Retief	399	7	2	206	614	+ 44,459	13,517	4,781	+ 22,194	75,389
Potchefstroom	1,820	1,674	305	545	4,344	+ 74,995	184	2,932	+ 16,155	61,956
Pretoria	667	334	3	151	1,155	+ 12,548	13,851	4,985	—	18,109
Rustenburg	70	1,421	32	2,016	3,539	+ 1,426	17,756	1,540	+ 5,935	23,577
Standerton	15,534	417	130	719	16,800	+ 719	7,837	590	+ 11,135	19,101
Wakkerstroom	5,576	15	90	168	5,849	+ 129,098	12,050	4,975	+ 247	112,320
Waterberg	—	—	—	—	—	+ 188,966	4,839	10,142	—	172,147
Wolmaransstad	1,749	270	45	100	2,164	—	18,306	—	+ 12,464	30,756
Zoutpansberg	140	2,263	105	2,714	5,222	+ 59,275	619	6,638	—	39,893
						+ 6,108	22,303	2,571	+ 60,001	85,841
Total	54,064	10,655	3,498	8,770	76,987	+ 768,481	+ 121,305	—	+ 156,082	973,441

RETURN OF SMALL STOCK IN THE SEVERAL DISTRICTS OF THE UNION ON THE 31ST DECEMBER, 1912.—Continued.

Districts.	Sheep and Goats under order to cleanse on 31st December.		Percentage of Flocks Infected.	Percentage of Sheep and Goats Infected.	No. of Sheep and Goats infected and visibly infected on 31st December.	Percentage of Sheep and Goats visibly Infected.	Stock free from Scab.			Total No. Portable Tanks.	Total No. Permanent Sheep-dipping Tanks.	No. tanks provided during past 12 months (permanent and portable).
	Flocks.	Sheep and Goats.					Flocks.	Sheep.	Goats.			
TRANSVAAL.												
Barberton	2	500	0.25	0.82	10	0.16	797	4,090	56,694	3	19	22
Bethal	10	7,056	1.78	2.95	51	0.021	552	210,040	22,007	7	90	8
Bloemhof	12	6,898	1.30	2.34	91	0.031	911	211,900	76,462	32	147	57
Carolina	2	1,914	0.24	0.93	13	0.006	822	161,569	43,191	18	180	73
Ermelo	14	15,768	1.01	2.78	179	0.032	1,376	514,083	38,108	9	212	16
Heidelberg	16	7,759	1.35	2.85	143	0.053	1,172	223,738	40,595	13	191	46
Johannesburg, Boksburg en Germiston	—	—	—	—	—	—	312	20,610	10,600	—	—	—
Krugersdorp	122	40,422	10.25	12.95	997	0.319	446	30,293	20,877	101	39	87
Lichtenburg	48	17,328	1.12	3.44	233	0.044	1,068	223,692	48,115	54	151	43
Lydenburg	7	1,511	0.94	1.70	39	0.044	4,237	247,829	238,995	61	112	14
Marico	9	856	0.31	0.24	19	0.005	738	46,921	40,586	39	64	25
Middelburg	4	241	0.28	0.16	22	0.015	2,870	207,866	146,154	120	142	76
Piet Retief	4	943	0.21	0.34	17	0.006	1,445	87,096	64,182	42	63	58
Potchefstroom	39	3,677	1.31	1.17	244	0.077	1,926	183,652	89,405	106	195	100
Pretoria	1	93	0.04	0.05	4	0.002	2,941	167,240	144,622	83	92	37
Rustenburg	11	6,778	1.02	1.53	134	0.030	2,467	76,171	111,980	185	99	81
Standerton	11	2,893	0.64	1.44	17	0.002	1,069	405,669	29,236	12	164	13
Wakkerstroom	13	2,038	0.59	0.02	29	0.015	1,710	612,385	64,407	39	184	121
Waterberg	5	2,404	0.63	0.92	12	0.005	2,199	76,944	119,914	163	38	57
Wolmaransstad	5	376	0.05	0.06	15	0.002	794	218,884	40,470	19	214	100
Zoutpansberg	335	126,455	0.81	2.05	2,269	0.003	10,839	234,595	401,089	380	245	208
Total							40,691	4,185,267	1,847,689	1,486	2,641	1,242

RETURN OF SMALL STOCK IN THE SEVERAL DISTRICTS OF THE UNION ON THE 31ST DECEMBER, 1912.—Continued.

Districts.	Total No. of Sheep and Goats.				No. of Small Stock.	Losses from Diseases.				Total No. of Sheep and Goats.	
	Sheep.		Goats.			Sheep.		Goats.			
	Woolled.	Non woolled.	Angora.	Others.		Woolled.	Non-woolled.	Angora.	Others.		
ORANGE FREE STATE.											
Bethlehem ..	1,811	345,904	56,143	37,606	16,800	456,453	12,958	432	566	—	13,956
Bethulie ..	639	224,482	54,823	5,900	5,599	290,804	8,136	1,526	15	—	9,677
Bloemfontein ..	3,077	1,130,287	69,141	19,130	11,467	1,230,025	29,359	2,270	211	80	31,920
Boshof ..	1,300	394,646	99,106	7,148	26,489	527,389	17,684	6,344	351	1,537	25,966
Edenburg ..	399	242,539	15,286	853	6,342	265,020	7,635	136	3	50	7,824
Fauresmith ..	1,179	354,518	149,032	38,961	25,690	568,201	10,304	8,034	537	598	19,473
Ticksburg ..	832	156,743	32,473	42,749	4,136	236,101	3,986	936	1,216	44	6,182
Frankfort ..	892	271,379	4,787	6,790	8,951	291,907	5,154	5	111	20	5,290
Harrismith ..	2,210	710,618	50,387	63,789	90,633	915,377	15,189	648	801	1,222	17,816
Heilbron ..	1,336	368,476	18,296	3,562	6,032	397,366	8,043	22	—	—	8,065
Hoopstad ..	1,791	309,459	53,324	51,485	12,395	426,663	18,253	1,862	743	10	20,868
Jacobsdal ..	442	95,105	78,277	7,570	23,518	204,470	—	—	—	—	—
Kroonstad ..	1,437	532,327	31,945	14,219	2,828	581,319	13,711	30	25	—	13,766
Ladybrand ..	1,086	264,947	9,882	6,202	3,371	284,402	2,987	174	—	—	3,161
Lindley ..	867	264,044	17,898	9,429	5,985	297,356	5,330	—	—	—	5,330
Philippolis ..	605	209,275	92,267	23,236	14,141	338,919	10,668	3,929	578	145	15,320
Rouxville ..	1,506	644,122	46,740	8,620	3,268	702,750	18,150	2,575	500	—	21,225
Senekal ..	1,268	401,642	20,120	26,583	6,820	455,165	3,679	—	—	—	3,679
Smithfield ..	807	428,976	26,216	2,845	1,931	459,968	11,357	196	143	12	12,008
Thaba N'chu ..	1,410	331,181	16,811	6,069	5,137	359,198	8,949	314	74	5	9,342
Vrede ..	1,245	544,023	17,672	20,987	40,885	623,567	18,244	158	575	80	19,057
Vredefort ..	744	166,150	17,102	18,637	2,461	204,350	5,458	456	311	80	6,305
Wepener ..	639	243,104	9,302	584	765	253,755	3,699	16	—	17	3,732
Winburg ..	2,490	775,709	46,286	36,146	19,510	877,651	6,284	202	333	—	6,819
TOTAL ..	30,012	9,409,656	1,034,266	459,100	345,154	11,248,176	245,217	30,615	7,093	3,900	286,825

RETURN OF SMALL STOCK IN THE SEVERAL DISTRICTS OF THE UNION ON THE 31ST DECEMBER, 1912.—Continued.

Districts.	Losses from Drought.				Total No. of Sheep and Goats.	Increase or Decrease since Census.				Total No. of Sheep and Goats.					
	Sheep.		Goats.			Sheep.		Goats.							
	Woolled.	Others.	Angora.	Others.		Woolled.	Others.	Angora.	Others.						
ORANGE FREE STATE.															
Bethlehem	865	160	76	—	1,101	+	53,123	—	10,286	—	8,757	—	16,078	+	18,002
Bethulie	17,998	2,476	324	40	20,838	+	18,869	—	9,631	—	2,917	—	1,792	+	4,529
Bloemfontein	49,604	2,076	449	138	52,267	+	400,537	—	36,296	—	5,216	—	15,556	+	343,469
Boshof	23,597	3,996	431	787	28,811	+	70,029	—	18,713	—	11,424	—	21,160	+	18,732
Edenburg	49,892	1,032	504	1,182	52,610	+	24,668	—	16,113	—	3,648	—	984	+	3,923
Fauresmith	22,785	14,739	2,967	1,695	42,186	+	48,095	—	14,523	—	1,073	—	15,738	+	16,761
Ficksburg	25	—	15	—	40	+	46,683	—	1,690	+	4,606	—	13,622	+	35,977
Frankfort	3,741	—	107	10	3,858	+	74,264	—	11,832	—	720	—	6,158	+	55,554
Harrismith	5,749	208	140	962	7,059	+	27,926	—	4,758	—	10,235	—	12,321	+	25,254
Heilbron	14,160	60	—	—	14,220	+	74,042	—	3,803	—	2,847	—	2,522	+	64,870
Hoopstad	11,326	1,076	694	30	13,126	+	41,266	—	6,718	+	4,154	—	11,640	+	40,498
Jacobsdal	8,711	10,733	526	1,106	21,076	+	45,589	—	21,384	+	1,285	—	3,885	+	72,143
Kroonstad	9,208	—	—	—	9,208	+	91,338	—	27,766	—	5,841	—	16,604	+	41,127
Ladybrand	400	—	—	—	400	+	56,648	—	6,268	—	2,986	—	3,175	+	44,219
Lindley	—	—	—	—	—	+	70,610	—	5,657	—	2,585	—	2,235	+	60,133
Philippolis	5,306	1,543	577	98	7,524	+	44,503	—	2,946	+	9,204	—	800	+	37,445
Rouxville	21,086	1,951	30	30	23,097	+	202,412	—	285	—	10,007	—	180	+	191,940
Senekal	—	—	—	—	—	+	99,497	—	10,673	—	6,935	—	8,274	+	87,485
Smithfield	14,400	130	207	8	14,745	+	66,149	—	13,695	—	2,598	—	1,194	+	48,662
Thaba 'Nehu	3,216	72	54	58	3,400	+	74,698	—	7,208	—	5,391	—	4,702	+	57,397
Vrede	12,008	—	44	25	12,077	+	157,647	—	17	—	14,882	—	17,598	+	125,150
Vredefort	1,735	11	—	—	1,804	+	56,526	—	253	—	5,073	—	8,387	+	53,465
Wepener	3,322	16	40	18	3,396	+	22,154	—	3,360	—	968	—	5	+	17,821
Wimburg	2,392	113	199	—	2,704	+	187,331	—	27,047	—	7,231	—	5,642	+	147,411
TOTAL	281,526	40,392	7,442	6,187	335,547	+	2,054,604	—	198,320	—	86,477	—	157,840	+	1,611,967

RETURN OF SMALL STOCK IN THE SEVERAL DISTRICTS OF THE UNION ON THE 31ST DECEMBER, 1912.—Continued.

Districts.	Sheep and Goats under order to cleanse on 31st December.		Percentage of Flocks Infected.	Percentage of Sheep and Goats Infected.	No. of Sheep and Goats visibly infected on 31st December.	Percentage of Sheep and Goats visibly infected.	Stock free from Scab.		Total No. Portable Dipping Tanks.	Total No. Permanent Sheep-dipping Tanks.	No. tanks provided during past 12 months (permanent and portable).	
							Flocks.	Goats.				
	Flocks.	Sheep and Goats.										
RANGE FREE STATE.												
Bethlehem	35	13,018	1.93	2.85	134	0.029	1,776	389,283	2	516	36	
Bethulia	28	13,274	4.40	4.56	580	0.200	611	266,186	1	203	—	
Bloemfontein	35	14,829	1.14	1.21	35	0.003	3,042	1,184,834	10	809	37	
Boshof	22	13,546	1.69	2.57	22	0.004	1,278	480,646	7	529	53	
Edenburg	57	30,024	14.29	11.33	45	0.017	342	228,194	—	180	8	
Fauresmith	131	83,382	11.11	14.67	863	0.152	1,048	432,647	5	350	4	
Ficksburg	—	—	—	—	—	—	832	189,216	4	246	8	
Frankfort	4	1,667	0.45	0.57	15	0.005	888	274,520	7	344	11	
Harrismith	54	26,353	2.44	2.88	630	0.069	2,156	736,758	14	354	41	
Heilbron	70	33,504	5.24	8.43	177	0.045	1,266	354,268	10	547	67	
Hoopstad	13	4,792	0.73	1.12	45	0.011	1,778	358,417	14	411	14	
Jacobsdal	17	10,414	3.85	5.09	49	0.024	425	163,225	5	130	4	
Kroonstad	9	6,882	0.63	1.18	8	0.001	1,428	557,556	25	516	32	
Ladybrand	2	1,044	0.18	0.37	9	0.003	1,084	273,785	2	299	—	
Lindley	1	950	0.12	0.32	7	0.002	866	280,992	1	340	6	
Philippolis	50	31,658	8.26	9.34	469	0.139	555	270,454	3	178	16	
Rouxpille	41	25,930	2.73	3.69	182	0.026	1,465	665,175	1	503	27	
Senekal	24	10,657	1.89	2.34	60	0.013	1,244	411,467	5	525	3	
Smithfield	34	21,017	4.24	4.57	56	0.012	773	434,292	2	297	18	
Thaba N'chu	17	4,523	1.21	1.26	105	0.029	1,393	343,770	4	275	2	
Vrede	5	4,381	0.40	0.70	9	0.001	1,240	557,314	17	234	3	
Vrededorst	4	2,868	0.54	1.40	8	0.004	740	180,384	16	221	27	
Wepener	—	—	—	—	—	—	639	252,406	—	192	—	
Winburg	91	33,940	3.66	3.87	461	0.053	2,399	788,405	6	712	35	
TOTAL	744	388,653	2.47	3.45	3,969	0.03	29,268	10,074,194	161	8,911	452	

RETURN OF SMALL STOCK IN THE SEVERAL DISTRICTS OF THE UNION ON THE 31ST DECEMBER, 1912.

District.	Total No. of Flocks.	Total No. of Sheep of Goats.				Total No. of Small Stock.	Losses from Diseases.				Total No. of Sheep and Goats.		
		Sheep.			Goats.		Sheep.			Goats.			
		Woolled.	Non-woolled	Angora.			Others.	Woolled.	Non-woolled.			Angora.	Others.
NATAL.													
Alexandra	800	610	650	20	25,610	26,890	12	—	—	—	—	12	
Alfred, including Lower Um- & zinkuthi	1,828	13,127	10,198	—	36,043	59,368	318	736	—	20	—	1,074	
Durban	27	760	740	—	205	1,705	—	—	—	—	—	—	
Klipriver, including— F Newcastle	3,554	262,167	71,634	32,661	107,040	473,502	7,158	410	618	773	—	8,959	
Dundee													
Klipriver													
Helpmekaar													
Pietermaritzburg— Camperdown													
Ixopo													
Polela													
Impendhle													
Lions River	5,314	266,210	24,919	500	110,980	402,609	5,368	715	75	36	—	6,194	
New Hanover													
Pietermaritzburg													
Richmond													
Umgeni													
Utrecht— Paulpietersburg	1,933	460,984	10,778	29,548	70,428	571,738	11,172	190	343	1,541	—	13,246	
Utrecht													
Umvoti— Krantzkop	571	93,935	15,163	—	14,207	123,305	—	—	—	—	—	—	
Victoria— Inanda													
Lower Tugela	574	150	8,874	38	33,948	43,010	—	—	—	—	—	—	
Mapumulo													
Vryheid— Mgotshe	2,526	263,760	25,348	3,848	73,867	366,823	3,991	557	52	1,112	—	5,712	
Babanango													
Weenen— Bergville	3,344	140,110	47,451	10,100	148,259	345,920	200	—	30	—	—	230	
Estcourt													
Impofana													
Total	20,471	1,501,813	215,755	76,715	640,587	2,414,870	28,219	2,608	1,118	3,482	—	35,427	
ZULULAND	10,020	81,846	79,335	958	191,492	353,631	—	434	—	88	—	522	

U.G. 47—'13.]

RETURN OF SMALL STOCK IN THE SEVERAL DISTRICTS OF THE UNION ON THE 31ST DECEMBER, 1912.—*(Continued.)*

District.	Losses from Drought.				Total No. of Sheep and Goats.	Increase or Decrease since Census.				Total No. of Sheep and Goats.						
	Sheep.		Goats.			Sheep.		Goats.								
	Woolled.	Non-woolled.	Angora.	Others.		Woolled.	Non-woolled.	Angora.	Others.							
NATAL.																
Alexandra	—	—	—	—	—	+	+	3	+	1,996	+	2,178				
Alfred, including Umzimkulu	281	14	—	—	295	—	+	5,741	—	6,845	+	3,408				
Durban	—	—	—	—	—	+	+	724	—	698	—	1,219				
Klipriver, including—																
Newcastle	11,046	768	350	460	12,624	+	+	86,494	—	4,531	—	26,852	+	38,930		
Dundee																
Klipriver																
Helpmekaar																
Pietermaritzburg—																
Camperdown																
Ixopo																
Potela																
Impendhle																
Lions River																
New Hanover																
Pietermaritzburg	1,950	320	—	70	2,340	+	+	9,026	—	5,697	—	5,064	+	6,331	+	15,990
Pietermaritzburg																
Richmond																
Ungeni																
Utrecht—																
Paulpietersburg																
Utrecht	1,777	—	—	—	1,777	+	—	203,009	—	109,969	—	8,042	—	25,178	+	59,820
Umvoti—																
Krantzkop	75	—	—	—	75	+	—	10,675	—	413	—	564	+	2,817	+	12,515
Victoria—																
Inanda																
Lower Tugela																
Mapumulo																
Vryheid—																
Mgotshe																
Babanango	165	20	—	—	185	+	—	121,967	—	4,663	—	6,834	—	24,134	+	86,336
Weenen—																
Bergbille																
Estcourt																
Impofana	471	—	—	—	471	+	—	2,811	—	6,229	—	4,078	+	7,878	+	12,840
Total	15,765	1,122	350	530	17,767	+	530	428,932	—	88,179	—	50,383	—	51,924	+	238,446
ZULULAND																
	—	—	—	—	—	+	—	49,704	—	30,966	—	604	+	2,171	+	21,513

RETURN OF SMALL STOCK IN THE SEVERAL DISTRICTS OF THE UNION ON THE 31st DECEMBER, 1912.—Continued.

District.	Sheep and Goats under order to cleanse on 31st December.		Percentage of Flocks Infected.	Percentage of Sheep and Goats Infected.	No. of Sheep and Goats visibly infected on 31st December.	Percentage of Sheep and Goats visibly Infected.	Stock free from Scab.			Total No. Portable Dipping Tanks.	Total No. Permanent Dipping Tanks.	No. of tanks provided during past 12 months (permanent and portable).
	Flocks.	Sheep and Goats.					Flocks.	Sheep.	Goats.			
NATAL.												
Alexandra	1	99	0.12	0.37	10	0.037	799	1,161	25,630	—	6	—
Alfred, including Lower Umzimkulu	—	—	—	—	—	—	1,828	23,325	36,043	22	42	35
Durban	—	—	—	—	—	—	27	1,500	205	—	—	—
Klipriver, including—												
Newcastle	22	4,722	0.62	1.00	154	0.033	3,532	329,871	138,909	43	332	125
Dundee	—	—	—	—	—	—	—	—	—	—	—	—
Klipriver	—	—	—	—	—	—	—	—	—	—	—	—
Helpmekaar	—	—	—	—	—	—	—	—	—	—	—	—
Pietermaritzburg—												
Camperdown	—	—	—	—	—	—	—	—	—	—	—	—
Ixopo	—	—	—	—	—	—	—	—	—	—	—	—
Polela	—	—	—	—	—	—	—	—	—	—	—	—
Impendhle	—	—	—	—	—	—	—	—	—	—	—	—
Lions River	10	4,823	0.18	1.11	195	0.048	5,304	286,306	111,480	43	494	67
New Hanover	—	—	—	—	—	—	—	—	—	—	—	—
Pietermaritzburg	—	—	—	—	—	—	—	—	—	—	—	—
Richmond	—	—	—	—	—	—	—	—	—	—	—	—
Umgeni	—	—	—	—	—	—	—	—	—	—	—	—
Utrecht—												
Paulpietersburg	17	6,363	0.88	1.10	160	0.028	1,916	466,069	99,366	23	176	92
Utrecht	—	—	—	—	—	—	—	—	—	—	—	—
Umvoti —	—	—	—	—	—	—	—	—	—	—	—	—
Krantzkop	—	—	—	—	—	—	571	109,098	14,207	—	91	—
Victoria—												
Isanda	—	—	—	—	—	—	—	—	—	—	—	—
Lower Tugela	1	80	0.18	0.19	6	0.014	573	9,024	33,906	—	—	—
Mapumulo	—	—	—	—	—	—	—	—	—	—	—	—
Vryheid—												
Mgotshe	15	3,516	0.59	0.96	146	0.040	2,511	286,316	76,991	7	121	88
Babanango	—	—	—	—	—	—	—	—	—	—	—	—
Weenen —												
Bergville	—	—	—	—	—	—	—	—	—	—	—	—
Estcourt	30	6,182	0.30	1.79	199	0.058	3,314	182,556	157,182	7	125	6
Impofana	—	—	—	—	—	—	—	—	—	—	—	—
Total	96	25,725	0.46	1.06	870	0.03	20,375	1,695,226	693,919	145	1,387	413
ZULULAND												
	132	18,069	1.31	5.10	988	0.27	9,888	144,924	190,638	35	30	—

GENERAL SUMMARY—UNION.

Areas.	Number. of Cases 1.7.12 to 31.12.12.	Total Fines.		Illegal Movement.		Failure to Report.		Failure to Cleanse.		Other Causes.	
		£	s. d.	Number of Cases.	Amount.	Number of Cases.	Amount.	Number of Cases.	Amount.	Number of Cases.	Amount.
Midland and Eastern, Cape ..	354	1,296	1 0	91	£ 441 0 0	213	£ 605 15 0	31	£ 97 16 0	43	£ 151 10 0
Maximum Fines	—	—	—	—	20 0 0	—	10 0 0	—	10 0 0	—	15 0 0
Northern & North-Western, Cape	154	381	0 0	41	128 0 0	83	133 10 0	16	41 0 0	36	78 10 0
Maximum Fines	—	—	—	—	15 0 0	—	6 0 0	—	5 0 0	—	10 0 0
Bechuanaland	13	28	10 0	11	22 10 0	—	—	1	5 0 0	1	1 0 0
Maximum Fines	—	—	—	—	5 0 0	—	—	—	5 0 0	—	1 0 0
Transkei	752	1,381	0 6	124	322 6 0	432	707 0 0	50	106 10 0	156	245 4 6
Maximum Fines	—	—	—	—	15 0 0	—	5 0 0	—	5 0 0	—	5 0 0
Transvaal	274	848	7 6	37	151 10 0	161	514 17 6	50	161 10 0	16	20 10 0
Maximum Fines	—	—	—	—	50 0 0	—	10 0 0	—	5 0 0	—	1 10 0
Orange Free State	242	1,007	0 0	36	195 15 0	131	552 10 0	32	163 5 0	22	95 10 0
Maximum Fines	—	—	—	—	20 0 0	—	10 0 0	—	25 0 0	—	15 0 0
Natal	180	628	7 6	27	122 10 0	147	492 15 0	3	8 0 0	2	5 2 6
Maximum Fines	—	—	—	—	10 0 0	—	15 0 0	—	5 0 0	—	5 0 0
Grand Total ..	1,969	5,570	6 6	367	1,383 11 0	1,167	3,006 7 6	183	583 1 0	276	597 7 0
Average	(General)	2 16 7	—	—	3 15 5	—	2 11 6	—	3 3 9	—	2 3 3

AVERAGE FINES.

Areas.	General Average.		For Illegal Movement.		For Failure to Report.		For Failure to Cleanse.		For other Causes.	
	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.
Midland and Eastern, Cape ..	3 13	3	Maximum 20	0 0	2 16 11	—	3 3 1	—	3 10 6	—
Northern and North Western, Cape	2 9	6	Maximum 3 2	5 0	10 0 0	—	10 0 0	—	15 0 0	—
Bechuanaland	2 3	10	Maximum 15	0 0	1 12 2	—	2 11 3	—	2 3 4	—
Transkei	1 16	11	Maximum 2	0 11	6 0 0	—	5 0 0	—	10 0 0	—
Transvaal	3 1	11	Maximum 5	0 0	—	—	5 0 0	—	1 0 0	—
Orange Free State	4 3	3	Maximum 15	0 0	1 12 9	—	2 2 7	—	1 11 5	—
Natal	3 9	10	Maximum 2 12	0 0	5 0 0	—	5 0 0	—	5 0 0	—
Maximum Fines	—	—	Maximum 4 1	1 1½	3 3 11½	—	3 2 7	—	1 5 7½	—
Maximum Fines	—	—	Maximum 50	0 0	10 0 0	—	5 0 0	—	1 10 0	—
Maximum Fines	—	—	Maximum 5 8	9 0	4 4 4	—	5 2 0	—	4 6 0	—
Maximum Fines	—	—	Maximum 20	0 0	10 0 0	—	25 0 0	—	15 0 0	—
Maximum Fines	—	—	Maximum 4 10	9 0	3 7 0	—	2 13 4	—	2 11 0	—
Maximum Fines	—	—	Maximum 10	0 0	15 0 0	—	5 0 0	—	5 0 0	—

Districts.	Number. of Cases, 1.7.12 to 31.12.12.	Total Fines.		Illegal Movement.		Failure to Report.		Failure to Cleanse.		Other Causes.	
		£	s. d.	Number of Cases.	Amount.	Number of Cases.	Amount.	Number of Cases.	Amount.	Number. of Cases.	Amount.
Aberdeen	7	21	0 0	1	£ s. d. 5 0 0	2	—	5	£ s. d. 11 0 0	1	£ s. d. 5 0 0
Albany, Alexandria and Bathurst	—	Maximum	5 0 0	—	5 0 0	—	—	—	5 0 0	—	—
Aliwal North	16	27	10 0	9	15 0 0	4	6 10 0	3	5 0 0	2	1 0 0
Albert	2	Maximum	5 0 0	1	3 0 0	—	3 0 0	—	2 0 0	—	1 0 0
Barkly East	7	Maximum	27 0 0	2	—	—	—	—	—	1	5 0 0
Beaufort West and Bedford ..	15	Maximum	61 10 0	8	14 0 0	5	13 0 0	—	—	—	5 0 0
Bredasdorp	1	Maximum	10 0 0	—	10 0 0	6	5 0 0	—	—	4	10 0 0
Britstown and Philipstown ..	17	Maximum	5 0 0	—	5 0 0	1	3 0 0	—	—	—	5 0 0
Caledon	10	Maximum	106 0 0	8	63 0 0	4	12 10 0	—	—	6	30 10 0
Cape, Paarl and Stellenbosch ..	4	Maximum	16 10 0	—	10 0 0	9	5 0 0	—	—	—	10 0 0
Cathcart	2	Maximum	20 0 0	—	—	4	16 10 0	—	—	—	—
Ceres	2	Maximum	20 0 0	1	—	—	3 0 0	—	—	—	—
Clanwilliam	2	Maximum	4 0 0	—	—	—	20 0 0	—	—	—	—
Colesberg	14	Maximum	7 0 0	1	2 0 0	1	5 0 0	—	—	—	—
Cradoock	16	Maximum	68 0 0	7	2 0 0	7	5 0 0	—	—	1	2 10 0
Fort Beaufort and Stockenstrom	—	Maximum	10 0 0	—	37 0 0	—	28 10 0	—	—	—	2 10 0
Glen Grey	12	Maximum	60 10 0	10	10 0 0	—	10 0 0	2	10 0 0	4	6 1 0
Graaff-Reinet	1	Maximum	Maximum	—	44 10 0	—	—	—	5 0 0	—	5 0 0
Hanover	9	Maximum	7 10 0	—	7 10 0	—	—	—	—	—	—
Herschel	16	Maximum	—	—	—	—	20 0 0	—	—	—	—
Jansenville	1	Maximum	65 0 0	5	45 0 0	7	5 0 0	—	—	—	—
King Williamstown and East London.	19	Maximum	10 0 0	1	15 0 0	—	—	—	—	—	—
Knysna and Humansdorp ..	3	Maximum	Maximum	—	10 0 0	—	—	—	—	—	—
Komgha	3	Maximum	29 10 0	—	10 0 0	9	29 10 0	—	—	—	—
Ladysmith, Riversdale and Swellendam.	8	Maximum	70 0 0	—	—	13	6 0 0	3	8 0 0	4	11 0 0
			Maximum	—	—	—	51 0 0	—	3 0 0	1	3 0 0
			Maximum	—	—	—	9 0 0	—	—	—	—
			Maximum	—	—	19	45 0 0	—	—	—	—
			Maximum	—	—	3	5 0 0	—	—	—	—
			Maximum	—	—	2	4 10 0	—	—	—	—
			Maximum	—	—	7	1 10 0	—	—	1	2 0 0
			Maximum	—	—	—	4 0 0	—	—	—	2 0 0
			Maximum	—	—	—	2 0 0	—	—	—	—
			Maximum	—	—	—	14 10 0	—	5 0 0	—	—
			Maximum	—	—	—	5 0 0	—	5 0 0	—	—

Districts.	Number of Cases, 1.7.12 to 31.12.12.	Total Fines.	Illegal Movement.		Failure to Report.		Failure to Cleanse.		Other Causes.	
			Number of Cases.	Amount.	Number of Cases.	Amount.	Number of Cases.	Amount.	Number of Cases.	Amount.
Malmesbury	—	£ s. d. — Maximum 10 0 0	—	—	—	—	—	—	—	—
Molteno	3	Maximum 10 0 0	—	—	—	—	—	—	—	—
Murraysburg	3	Maximum 6 10 0	1	5 10 0	2	1 0 0	—	—	—	—
Oudtshoorn	4	Maximum 45 0 0	3	30 0 0	1	7 10 0	—	—	1	7 10 0
Peddie	16	Maximum 46 0 0	3	20 0 0	13	7 10 0	—	—	3	7 10 0
Piquetburg and Tulbagh	5	Maximum 13 0 0	—	2 10 0	4	27 5 0	1	3 15 0	—	12 10 0
Port Elizabeth	3	Maximum 1 10 0	—	1 10 0	—	3 15 0	—	—	1	7 10 0
Prince Albert	9	Maximum 19 0 0	—	—	2	8 0 0	—	—	—	5 0 0
Queenstown	27	Maximum 99 0 0	6	15 0 0	2	3 0 0	—	—	—	—
Richmond.. ..	4	Maximum 12 10 0	5	5 0 0	21	1 0 0	—	—	—	—
Robertson and Montagu	—	Maximum —	2	30 0 0	—	58 0 0	2	11 0 0	—	—
Somerset East	15	Maximum 49 11 0	—	10 0 0	—	10 0 0	—	—	—	—
Steynsburg	3	Maximum 10 0 0	—	5 0 0	—	2 0 0	—	—	—	—
Steytlerville	1	Maximum 2 0 0	2	5 0 0	1	3 0 0	—	—	—	—
Stutterheim	4	Maximum 9 10 0	—	—	4	3 0 0	—	—	—	—
Tarka	12	Maximum 43 0 0	2	8 0 0	7	2 0 0	—	—	—	—
Uitenhage	—	Maximum —	—	5 0 0	—	18 0 0	3	17 0 0	—	—
Uniondale, George and Mossel Bay.	2	Maximum 8 0 0	—	—	—	10 0 0	—	—	—	—
Victoria East	6	Maximum 23 0 0	2	8 0 0	—	5 0 0	—	—	—	—
Victoria West	7	Maximum 25 0 0	1	5 0 0	5	20 0 0	—	—	—	—
Willowmore	—	Maximum —	—	3 0 0	—	19 0 0	1	2 0 0	—	—
Wodehouse	24	Maximum 116 0 0	—	4 0 0	—	5 0 0	—	—	—	—
Worcester and Laingsburg	17	Maximum 56 0 0	1	2 10 0	18	72 10 0	2	6 0 0	6	35 0 0
GRAND TOTALS	34	1,296 1 0	91	441 0 0	213	605 15 0	31	97 16 0	43	151 10 0
Average Fines	—	3 13 3	—	4 17 2	—	2 16 11	—	3 3 1	—	3 10 6

SUMMARY—NORTHERN AND NORTH WESTERN DISTRICTS, CAPE.

Districts.	Number. of Cases 1.7.12 to 31.12.12.	Total Fines.		Illegal Movement.		Failure to Report.		Failure to Cleanse.		Other Causes.	
		£ s. d.	Number of Cases.	Amount.	Number of Cases.	Amount.	Number of Cases.	Amount.	Number of Cases.	Amount.	
Barkly West	29	78 0 0 Maximum	8	£ 9 0 0 3 0 0 0	22	£ 44 10 0 6 0 0 0	2	£ 8 0 0 5 0 0 0	14	£ 16 10 0 2 0 0 0	
Calvinia	5	6 0 0 Maximum	2	2 0 0 0	3	4 0 0 0	—	—	—	—	
Carnarvon	45	63 0 0 Maximum	8	1 0 0 0	24	2 0 0 0	9	16 0 0 0	3	4 0 0 0	
Fraserburg	13	74 10 0 Maximum	10	21 0 0 0	2	3 0 0 0	2	3 0 0 0	—	2 0 0 0	
Hay	11	21 10 0 Maximum	4	7 10 0 0	4	10 0 0 0	1	4 0 0 0	2	2 10 0 0	
Herbert	3	7 0 0 Maximum	—	15 0 0 0	—	4 0 0 0	—	4 0 0 0	2	1 10 0 0	
Hopetown	—	—	—	11 0 0 0	—	3 0 0 0	—	4 0 0 0	—	7 0 0 0	
Kenhardt	10	23 0 0 Maximum	2	4 0 0 0	7	—	—	—	—	5 0 0 0	
Kimberley	10	29 0 0 Maximum	—	—	10	—	—	—	1	—	
Namaqualand	4	—	—	1 0 0 0	—	19 0 0 0	—	—	—	3 0 0 0	
Prieska	3	25 0 0 Maximum	—	1 0 0 0	—	6 0 0 0	—	—	—	3 0 0 0	
Sutherland	1	2 0 0 Maximum	—	—	1	14 10 0 0	—	—	9	14 10 0 0	
Van Rhynsdorp	20	52 0 0 Maximum	7	—	10	2 10 0 0	—	—	—	2 10 0 0	
Grand Totals	154	381 0 0	41	£ 128 0 0	83	£ 133 10 0	16	£ 41 0 0	36	£ 78 10 0	
Average Fine	—	2 9 6	—	3 2 5	—	1 12 2	—	2 11 3	—	2 3 4	
Highest Fine imposed	—	15 0 0	for illegal movement.		—	—	—	—	—	—	

[U.G. 47—'13.]

SUMMARY—TRANSKEI.

121

Districts.	Number of Cases, 1.7.12 to 31.12.12.	Total Fines.	Illegal Movement.		Failure to Report.		Failure to Cleanse.		Other Causes.	
			Number of Cases.	Amount.	Number of Cases.	Amount.	Number of Cases.	Amount.	Number of Cases.	Amount.
Bizana	55	£ s. d. 108 0 0 Maximum	4	£ s. d. 10 0 0 5 0 0	3	—	5	£ s. d. 5 0 0 1 0 0	36	£ s. d. 93 0 0 5 0 0
Butterworth	7	7 0 0 Maximum	—	—	7	7 0 0 1 0 0	—	—	—	—
Elliot	13	18 2 6 Maximum	2	4 0 0 2 0 0	5	9 0 0 2 0 0	5	5 0 0 5 0 0	1	0 2 6 0 2 6
Elliotdale	21	57 10 0 Maximum	18	49 10 0 15 0 0	2	5 0 0 4 0 0	—	—	1	3 0 0 3 0 0
Engcobo	21	86 10 0 Maximum	13	56 0 0 10 0 0	7	25 10 0 5 0 0	—	—	1	5 0 0 5 0 0
Flagstaff	24	37 7 6 Maximum	—	—	16	18 17 6 4 0 0	7	13 10 0 3 0 0	1	5 0 0 5 0 0
Idutywa	39	76 1 0 Maximum	9	12 1 0 4 0 0	30	64 0 0 3 0 0	—	—	—	—
Kentani	5	11 10 0 Maximum	2	4 10 0 3 0 0	3	5 0 0 2 0 0	—	—	1	2 0 0 2 0 0
Libode	35	36 2 6 Maximum	2	2 0 0 1 0 0	29	27 7 6 2 0 0	—	—	7	6 15 0 1 10 0
Lusikisiki	33	27 5 0 Maximum	4	2 10 0 1 0 0	—	—	—	—	29	24 15 0 2 10 0
Maclea	8	20 0 0 Maximum	5	18 0 0 10 0 0	2	2 0 0 2 0 0	1	—	—	—
Matatiele	46	126 15 0 Maximum	17	66 15 0 10 0 0	29	60 0 0 5 0 0	—	—	—	—
Mqanduli	30	85 10 0 Maximum	2	5 0 0 3 0 0	23	68 0 0 5 0 0	—	—	5	12 10 0 3 0 0
Mount Ayliff	1	5 0 0 Maximum	—	—	1	5 0 0 5 0 0	—	—	—	—
Mount Currie	11	11 12 0 Maximum	2	3 0 0 2 0 0	6	5 10 0 2 0 0	—	—	3	2 2 0 2 0 0
Mount Fletcher	13	34 15 0 Maximum	4	24 10 0 10 0 0	7	10 5 0 2 0 0	—	—	—	—

[U.G. 47—'13.]

SUMMARY—TRANSKEL.—Continued.

Districts.	Number of Cases, 1.7.12 to 31.12.12.	Total Fines.	Illegal Movement.		Failure to Report.		Failure to Cleanse.		Other Causes.	
			Number of Cases.	Amount.	Number of Cases.	Amount.	Number of Cases.	Amount.	Number of Cases.	Amount.
Mount Frere	64	£ s. d. 105 0 0 Maximum	8	£ s. d. 7 0 0 3 0 0	36	£ s. d. 5 0 0 3 0 0	—	£ s. d. —	23	£ s. d. 40 0 0 5 0 0
Ngqeleni	57	41 15 0 Maximum	—	—	30	40 5 0 3 0 0	—	—	27	1 10 0 1 10 0
Nqamakwe	10	11 10 0 Maximum	—	—	9	10 10 0 2 0 0	—	—	1	1 0 0 1 0 0
Qumbu	12	10 5 0 Maximum	11	9 5 0 1 0 0	—	—	—	—	1	1 0 0 1 0 0
St. John's	—	— Maximum	—	—	—	—	—	—	—	—
St. Mark's	19	14 0 0 Maximum	—	—	17	8 0 0 3 0 0	—	—	2	6 0 0 3 0 0
Tabankulu	1	3 0 0 Maximum	—	—	—	—	—	—	1	3 0 0 3 0 0
Tsolo	6	13 0 0 Maximum	4	8 0 0 4 0 0	1	3 0 0 3 0 0	—	—	1	2 0 0 2 0 0
Tsomo	—	— Maximum	—	—	—	—	—	—	—	—
Umtata	207	411 10 0 Maximum	13	27 5 0 5 0 0	167	269 5 0 4 0 0	32	83 0 0 3 0 0	13	32 0 0 3 0 0
Umzimkulu	—	— Maximum	—	—	—	—	—	—	—	—
Willowvale	4	15 0 0 Maximum	2	6 0 0 5 0 0	2	4 10 0 2 10 0	—	—	2	4 10 0 2 10 0
Xalanga	2	7 0 0 Maximum	2	7 0 0 5 0 0	—	—	—	—	—	—
Grand Total	752	1,381 0 6	124	322 6 0	432	707 0 0	50	106 10 0	156	245 4 6
Average Fines .. .. .	..	1 16 11	..	2 12 0	..	1 12 9	..	2 2 7	..	1 11 5

SUMMARY—TRANSVAAL.

Districts.	Number of Cases, 1.7.12 to 31.12.12.	Total Fines.	Illegal Movement.		Failure to Report.		Failure to Cleanse.		Other Causes.	
			Number of Cases.	Amount.	Number of Cases.	Amount.	Number of Cases.	Amount.	Number of Cases.	Amount.
		£ s. d.		£ s. d.		£ s. d.		£ s. d.		£ s. d.
Barberton	3	9 0 0 Maximum	1	5 0 0	1	2 0 0	1	2 0 0	—	—
Bethal	1	5 0 0 Maximum	—	5 0 0	—	2 0 0	—	2 0 0	—	—
Bloemhof	3	9 0 0 Maximum	—	—	1	5 0 0	—	—	—	—
Carolina	4	10 10 0 Maximum	—	—	3	9 0 0	—	—	—	—
Ernelo	3	11 0 0 Maximum	1	4 0 0	2	3 0 0	—	—	—	—
Heidelberg	40	119 0 0 Maximum	—	4 0 0	3	6 10 0	—	—	—	—
Johannesburg	23	97 0 0 Maximum	—	—	11	11 0 0	—	—	—	—
Krugersdorp	16	21 0 0 Maximum	2	6 0 0	38	5 0 0	—	5 0 0	—	—
Lichtenburg	9	17 0 0 Maximum	—	3 0 0	—	10 0 0	1	5 0 0	—	—
Lydenburg	27	61 2 6 Maximum	—	—	19	97 0 0	—	—	—	—
Marico	—	— Maximum	—	—	9	10 0 0	—	—	—	—
Middelburg	26	53 10 0 Maximum	1	2 0 0	2	19 0 0	6	13 0 0	—	—
Piet Retief	14	98 10 0 Maximum	—	2 0 0	2	3 0 0	—	3 0 0	—	—
Potchefstroom	14	57 0 0 Maximum	—	—	14	37 2 6	—	1 0 0	—	—
Pretoria	17	20 15 0 Maximum	3	23 0 0	—	5 0 0	—	1 0 0	—	—
Rustenburg	9	36 0 0 Maximum	6	8 0 0	8	9 5 0	2	1 10 0	—	—
Standerton	10	23 10 0 Maximum	4	18 0 0	2	2 0 0	2	1 0 0	—	—
Wakkerstroom	17	36 0 0 Maximum	—	5 0 0	8	5 0 0	—	5 0 0	—	—
Waterberg	11	52 0 0 Maximum	—	—	13	29 10 0	1	5 0 0	—	—
Wolmaransstad	1	0 10 0 Maximum	—	—	—	3 0 0	11	52 0 0	—	—
Zoutpansberg	26	111 0 0 Maximum	2	20 0 0	8	29 0 0	14	61 0 0	2	1 0 0
			—	15 0 0	—	10 0 0	—	—	—	0 10 0
Grand Total	274	848 7 6	37	151 10 0	161	514 17 6	50	161 10 0	16	20 10 0
Average Fine	—	3 1 11	—	4 1 1½	—	3 3 11½	—	3 2 7	—	1 5 7½
Highest Fine imposed	—	50 0 0	—	for illegal movement and failure to report outbreak of scab,	—	Piet Retief.	—	—	—	—
November, 1912.										

SUMMARY—NATAL.

Districts.	Number of Cases, 1.7.12 to 31.12.12.	Total Fines.	Illegal Movement.		Failure to Report.		Failure to Cleanse.		Other Causes.	
			Number of Cases.	Amount.	Number of Cases.	Amount.	Number of Cases.	Amount.	Number of Cases.	Amount.
Alfred	—	£ s. d. — Maximum	—	£ s. d. —	—	£ s. d. —	—	£ s. d. —	—	£ s. d. —
Klipriver	55	233 10 0 Maximum	13	73 10 0 10 0 0	40	153 0 0 10 0 0	2	7 0 0 5 0 0	—	—
Paul Pietersburg	8	18 0 0 Maximum	2	7 0 0 5 0 0	5	10 0 0 3 0 0	1	1 0 0 1 0 0	—	—
Pietermaritzburg	2	5 5 0 Maximum	—	—	2	5 5 0 5 0 0	—	—	—	—
Umvoti	2	9 0 0 Maximum	—	—	2	9 0 0 6 0 0	—	—	—	—
Utrecht	20	35 10 0 Maximum	—	—	20	35 10 0 5 0 0	—	—	—	—
Victoria and Durban	—	— Maximum	—	—	—	—	—	—	—	—
Vryheid.. .. .	40	157 0 0 Maximum	—	—	40	157 0 0 15 0 0	—	—	—	—
Weenen	22	80 0 0 Maximum	4	20 0 0 5 0 0	18	57 0 0 5 0 0	—	—	—	—
Zululand	31	93 2 6 Maximum	8	22 0 0 5 0 0	20	65 0 0 5 0 0	—	—	2	5 2 6 5 0 0
Grand Total	180	628 7 6	27	122 10 0	147	492 15 0	3	8 0 0	2	5 2 6
Average Fine	—	3 9 10	—	4 10 9	—	3 7 0	—	2 13 4	—	2 11 0

SUMMARY—ORANGE FREE STATE.

Districts.	Number of Cases, 1.7.12 to 31.12.12.	Total Fines.		Illegal Movement.		Failure to Report.		Failure to Cleanse.		Other Causes.	
		£ s. d.	Maximum.	Number of Cases.	Amount.	Number of Cases.	Amount.	Number of Cases.	Amount.	Number of Cases.	Amount.
Bethlehem	6	38 0 0	Maximum	1	20 0 0	3	13 0 0	1	5 0 0	—	—
Bethulie and Edenburg ..	10	39 10 0	Maximum	2	17 10 0	2	5 0 0	2	15 0 0	2	2 0 9
Bloemfontein	12	94 0 0	Maximum	6	43 10 0	7	36 10 0	2	10 0 0	1	4 0 0
Boshof	21	79 0 0	Maximum	4	13 0 0	13	53 0 0	2	12 0 0	1	1 0 0
Fauresmith	5	12 0 0	Maximum	2	10 0 0	—	—	1	2 0 0	—	—
Ficksburg	6	35 0 0	Maximum	—	—	4	24 10 0	1	10 0 0	1	0 10 0
Frankfort	5	29 0 0	Maximum	1	10 0 0	4	19 0 0	—	—	—	—
Harrismith	43	188 10 0	Maximum	5	23 0 0	23	119 10 0	3	35 0 0	3	11 0 0
Heilbron	—	—	Maximum	—	—	—	—	—	25 0 0	—	5 0 0
Hoopstad	30	99 10 0	Maximum	5	14 0 0	18	70 10 0	2	8 0 0	3	7 0 0
Jacobsdal	9	62 10 0	Maximum	—	—	4	18 0 0	—	—	4	44 10 0
Kroonstad	3	9 0 0	Maximum	—	—	3	9 0 0	—	—	—	—
Ladybrand	1	8 0 0	Maximum	—	—	1	8 0 0	—	—	—	—

SUMMARY—ORANGE FREE STATE.—Continued.

Districts.	Number of Cases, 1.7.12 to 31.12.12.	Total Fines.	Illegal Movement.		Failure to Report.		Failure to Cleanse.		Other Causes.	
			Number of Cases.	Amount.	Number of Cases.	Amount.	Number of Cases.	Amount.	Number of Cases.	Amount.
Lindley	9	£ s. d. 22 10 0 Maximum	—	£ s. d. — —	9	£ s. d. 22 10 0 5 0 0	—	£ s. d. — —	—	—
Philippolis	7	16 0 0 Maximum	3	4 10 0 2 10 0	2	7 10 0 5 0 0	1	4 0 0 4 0 0	—	—
Rouxville	16	48 0 0 Maximum	1	1 0 0 1 0 0	3	11 0 0 5 0 0	8	31 0 0 10 0 0	1	5 0 0 5 0 0
Senekal	5	24 0 0 Maximum	—	—	4	14 0 0 5 0 0	1	10 0 0 10 0 0	—	—
Smithfield	1	7 10 0 Maximum	—	—	—	—	1	7 10 0 7 10 0	—	—
Thaba 'Nchu	—	— Maximum	—	—	—	—	—	—	—	—
Vrede	13	118 0 0 Maximum	3	35 0 0 15 0 0	10	83 0 0 15 0 0	—	—	—	—
Vredefort	12	16 0 0 Maximum	2	2 5 0 2 0 0	9	11 10 0 2 10 0	1	2 5 0 2 5 0	—	—
Wepener	8	14 0 0 Maximum	—	—	2	3 10 0 2 10 0	5	10 10 0 5 0 0	—	—
Winburg	20	47 0 0 Maximum	1	2 0 0 2 0 0	10	23 10 0 5 0 0	1	1 0 0 1 0 0	6	20 10 0 5 0 0
Grand Total	242	1,007 0 0	36	195 15 0	131	552 10 0	32	163 5 0	22	95 10 0
Average Fine	—	4 3 3	—	5 8 9	—	4 4 4	—	5 2 0	—	4 6 0
Highest Fine imposed	—	25 0 0	—	for failure to cleanse, Harrismith, September, 1912.	—	—	—	—	—	—

STATEMENT 4.

EXPORTS.

Articles.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Wool	132,207,029 lbs.	£3,899,828	161,974,684 lbs.	£4,780,594
Sheep	2,805 lbs.	3,571	3,667 lbs.	4,843
Mutton	60,909 lbs.	1,308	128,686 lbs.	2,577
Mohair	21,966,825 lbs.	917,874	23,479,729 lbs.	967,286
Sheep Skins	23,996,966 lbs.	574,457	20,029,147 lbs.	724,196
Goat Skins	7,469,158 lbs.	262,636	8,126,360 lbs.	291,695

IMPORTS.

Articles.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Woollen Manufactures	—	£891,769	—	£925,430
Sheep	5,426 lbs.	37,460	2,776 lbs.	24,319
Mutton	3,463,899 lbs.	32,308	2,641,790 lbs.	25,450
Mohair	1,156 lbs.	35	—	1,269
Sheep and Goat Skins	66,969 lbs.	1,941	14,700 lbs.	420
Dipping Tanks	—	—	—	962
Wool Bags	505,540 lbs.	36,929	634,615 lbs.	58,619
Sheep Dips	—	74,197	—	90,803

WOOL EXPORTED FOR FIVE YEARS.

Year.	Quantity.	Value.
1908	104,252,696	£2,768,086
1909	130,973,389	3,728,251
1910	121,668,028	3,830,819
1911	132,207,029	3,899,828
1912	161,974,684	4,780,594
TOTALS	651,075,826	£19,007,578

Stud Sheep Farm,
Ermelo, May, 17th, 1913.

The Chief, Division of Sheep,
P.O. Box 1251, Pretoria.

ANNUAL REPORT FOR YEAR ENDING MARCH 31st, 1913.

Sir,—

I have the honour to render the Annual Report covering period 1st January, 1912, to March 31st, 1913, or over a period of fifteen months.

As you are aware, I have been in charge here from the 1st October, 1912, so that I can only really report for six months. I will, however, do my utmost to complete the report for the whole period with the assistance of the late Manager's Monthly Reports.

I would like to mention that I was sadly handicapped in taking over the management of the farm so late in the season as October. I had to do a lot of ploughing that should have been done during the winter, consequently I was late with everything. During the time I should have been making improvements, such as tree-planting, fencing, etc., I had to try and get my crops in. The season, luckily, was a very good one, otherwise I should have been very much behind.

FINANCE.

The total revenue for the period under review amounted to £1,635 14s. 11d., allocated as under:

Sale of Livestock	...	...	...	...	£1,054	0	7
„ „ Wool	...	...	...	...	327	13	11
„ „ Skins	...	...	...	...	7	3	7
„ „ Seeds	...	...	...	...	18	0	0
„ „ Cream	...	...	...	...	13	10	1
Hostel Fees	...	...	...	...	215	6	9
					£1,635	14	11
Fee issues to other Divisions	...	...	...	...	£465	10	0

EXPENDITURE FOR FINANCIAL YEAR ENDING MARCH 31st, 1913.

Item:

No. 1 Salaries	...	...	...	£702	5	0	£702	5	0
No. 2. Transport and Travelling	...	...	...	69	19	8	69	19	8
No. 3. General Maintenance,	...	...	...	...	...	...	...	...	...
Labour	...	...	...	1,364	6	6			
Foodstuffs, seeds, and	...	...	...	...	...	...
manures	...	...	...	1,243	3	8			
Fencing material	...	...	...	46	6	2			
Maintenance of Hostel	...	...	...	201	6	7			
Ent. All. and Incd. Expenses	...	...	...	76	1	11			
Railage (unallocated)	...	...	...	80	0	0			
							3,011	4	10

WEATHER.

From June, 1912, until the Spring of the year we had very little rain. The winter was a very severe one indeed for all kinds of stock, it being the most severe ever experienced on this farm. The Spring and Summer, however, were very good.

The rainfall from January to October was 16.46 inches, and from October until March 31st, 1913, 25.08 inches

SHEEP.

I cannot say much regarding the sheep from January to September, I will quote from the monthly reports of the Shepherd: "In January Ophthalmia broke

out amongst the sheep, but was speedily stamped out. The ewes were put to the rams in March for the August lambing; ninety-three were dropped during April. A stud ram was loaned from Mr. Robertson and was put to ewes in May; 110 lambs were born in August and September. The annual sale of rams was held on the 13th of November. It proved a very disappointing sale, owing to the fact that it was very poorly advertised. Some excellent young rams were offered, most of which were practically given away.

As you know, we run two types of sheep here, viz: Tasmanian and Wanganella. At the next shearing I intend shearing the two flocks separately, in order to see which gives the best return. Strictly speaking, the comparison will not be fair, as in my opinion the Wanganellas here are better than the Tasmanians we have.

Our Tasmanians are too short and wrinkly. They are, however, being steadily improved and will soon, I hope, compare very favourably with the Wanganellas. Our object is to breed a large plain-bodied Tasmanian, cutting a fleece of good length and density. The Wanganellas on the place are plain-bodied sheep cutting a good length of wool, they having been bred on these lines for years. There are, however, Tasmanians in this country at present which compare very favourably with the Wanganellas in the above respects.

As I mentioned before, a stud ram was borrowed from Messrs. A. and V. Robertson. We also sent five ewes to Mr. W. Buhrmann's ram. The conditions were that should any of the above gentlemen require the same from us we would assist them. Now, in my opinion, this is a practice that should be encouraged among Stud Breeders. It is extensively done in Australia. For instance, I may have twenty ewes which must be mated to a certain ram which I do not happen to have. Some other stud breeder may have the very ram I require, in which case I either borrow or lease the ram, or else send the ewes to him. If this is not done, the breeder may have to purchase a ram at perhaps great expense.

During the year an up-to-date wool shed and sheep drafting yards were erected. These are a great asset to the farm. It is a great pity more farmers do not erect drafting yards, as they are indispensable on a sheep farm and very cheap. The conditions for sheep on the farm have not been too good, the principal trouble being lack of good water in the paddocks. I trust that this will be put right in the near future. Arrangements are being made for the improvement of winter pastures for sheep as well as cattle.

Personally, I do not think the Highveld is as good as it is supposed to be for sheep farming. There are too many diseases. Of course, some parts of the Highveld are much better than others. I do not think this farm too well suited for sheep. My principal reasons for thinking so are, that most of the grass is too coarse, there is a deficiency of lime and there are too many vleis and springs. Lack of lime and too many vleis on a farm are conducive to wire worm, which is very harmful to sheep. Sheep here suffer a great deal from pneumonia, for which the sudden changes in the climate, no doubt and the altitude are probably responsible.

I have no doubt that when we get more good pasture grasses and much more shelter in the shape of trees, the conditions will be greatly improved.

All the sheep were dipped after shearing. The dip on the farm will have to be altered considerably before it is efficient.

At shearing time 330 sheep were shorn. The average yield of wool per sheep was 14 lb. 13 oz.

3	bales of fleeces fetched	11½d.
2	"	9½d.
3	"	8¾d.

The birthrate during fifteen months under review was 80 per cent.

The deathrate during fifteen months under review was 8 per cent. 2 per cent. were killed for rations and destroyed for various reasons.

The total number of sheep on hand March 31st, 1913, was:—

Ewes	...	309
Lambs	...	183
Rams	...	5
Wethers		7

504

CATTLE (FRIESLANDS).

The Friesland cattle have done well during the year. The increase has not been too good, on account of our being without a Stud bull for part of the year.

We were unfortunate in having an outbreak of Tuberculosis during the year, one queen cow and three yearling bulls reacting. These were all slaughtered. Six calves were subsequently tested, but none reacted. All the cow byres and cattle stables have been thoroughly disinfected.

We had several cases of gall sickness during the year, but were successful in pulling them all through. I think all our cattle should be inoculated against this disease. Milk records of the above herd are being kept, and butter is being made for the students when milk is plentiful.

Two young bulls were sold in December, averaging £65. I will only have one young Fries bull to offer at the next sale. Some of these cattle were exhibited at the Johannesburg Show, and succeeded in taking the following awards:—

2nd and 3rd in open classes for cows.
1st and 2nd in Transvaal bred cow class.

The byre wherein these cows are stabled at present has three wood and iron sides and is very draughty. I would recommend that this be brick lined.

The number of Fries Cattle on hand at March 31st, 1913, is as follows:—

Cows ...	...	...	15
Heifers ...	...	...	1
Bulls (Young) ...	...	...	1
Calves ...	...	...	10

CATTLE (ABERDEEN ANGUS).

These cattle have done well during the year, and are increasing in popularity. The Stud Bull was sold at the Johannesburg Show. The increase has not been too good, for what reason I do not know, as the old bull served all the cows. We require a rather big-framed bull, as several of our cows are on the small side. Four young bulls were sold in December, averaging £56. The demand was very keen, and we could have sold a lot more had we had them. We will have four young bulls for sale next year.

An outbreak of Tuberculosis also occurred in this herd, one cow and one bull having reacted. These were destroyed. Subsequently three calves were tested, but none reacted.

The total number at March 31st, 1913, was as follows:—

Cows ...	...	...	13
Heifers ...	...	...	7
Calves ...	...	...	6
Bulls(Young) ...	...	...	4

OXEN.

The oxen on the farm have done well. Two spans of old oxen were exchanged for two young spans.

The oxen were all subjected to the Tuberculin test, with the result that three reacted, which were destroyed.

There are at present forty-eight oxen on the farm.

HORSES.

We had two Clydesdale mares and two half-bred Clydesdale mares. One of the Clydesdale mares died from Billiary Fever, the other has been transferred to the Standerton Stud Farm. One of the half-breds died from stomach trouble, combined with old age. The other half-bred is still on the place, but ought to be cast for age. The Clydesdale geldings have been transferred from Potchefstroom to this farm, and are doing very well. Besides these, we have four mares and three geldings on the place. Two of these mares and one gelding will soon have to be cast for age.

Number of horses on hand, March 31st:—

Clydesdale	Geldings	2
Half-bred	Mares	... 1
Mares (ordinary)		... 4
Geldings	...	... 3
		—
		10

MULES.

When I took over, there were six mules on the farm, nine were taken over from the Sheep Division, making a total of fifteen. Subsequently six were transferred to the Division of Forestry.

Mules on hand March 31st: 9

PIGS.

We have no pigs on the farm.

CROPS.

The following crops were hayested during the period under review:—

Mealies	...	...	800 bags.	Ensilage	...	...	140 tons.
Oats	...	...	100 bags.	Potatoes	...	...	80 bags.
Oaten Hay	...	...	100 tons.	Veld Hay	...	...	20 tons.

The before mentioned are, of course, crops sown in 1911 and reaped in 1912, by the late General Manager. The Spring of 1912 was very dry and unfavourable for agriculture. The oat crop sown in September was a failure. I had to resow about thirty acres which afterwards proved a success. The winter oats, on which the sheep had been grazing during the winter, turned out very well. This crop was grown on the "Dry Farm" system. Inset is a photograph of the crop. The maize crop sown in November was as follows:—44 acres yellow cange, 17 acres Johnstone's County, 15 acres Iowa Silver Mine, 7½ acres Chester County Mammoth. These have all done very well, with the exception of the last named, which was sown rather late.

I think I ought to have a very good crop of mealies. 10 bags of New Zealand feed oats were sown, which gave good results. 40 acres of mealies were planted for ensilage, which are doing well. 8 acres of roots were put in. Owing to pressure of work these were put in rather late. They have, however, done well, and I expect to get a fair crop. 40 acres of teff were sown. This crop has done very well. 20 acres of Dwarf Essex Rape were sown. 10 acres of Winter Barley and 40 acres of Winter Oats were sown. The land on which the winter oats are sown is land I am preparing for Tall Fescue next year. It is new ground which has been fallowed for a year, and was to have been sown with grasses this year, but I have put the oats in to kill the natural grasses properly. 10 acres of Tall Fescue were put in and are looking splendid. The land was prepared on the before mentioned system. The failure of the Tall Fescue sown last year I ascribe to the natural grasses not having been properly killed. The Phalaris Rulbosa is looking well. It is a very hardy grass and I think a great deal of it for winter pasture for sheep. I find Basic Slag a very good manure for grasses.

A large quantity of sweet grass and veld hay was cut and stacked.

TREES.

Trees, if the soil is judiciously selected, do well on the farm. The trees planted along both sides of the Bethal road did not do too well, on account of last year's drought. Trees were planted along the east, and part of the northern boundaries of the farm. They are doing well. A large shelter, in the shape of a cross, was planted in one of the paddocks. Several smaller patches were also planted. More trees would have been planted but the ground was not prepared. In all, 15,000 trees were planted.

[U.G. 47—'13.]

What a great pity farmers do not go in more for tree planting. Trees are very cheap. The value of their farms would increase and the stock would then have the shelter they so badly need.

EXPERIMENTS.

As far as I can gather no experiments were conducted during the year under review. I, however, intend conducting experiments with pasture grasses.

WATER SUPPLY.

This has been a source of trouble for a long time, and I trust that we will soon see a change in the present system.

HOSTEL.

The hostel on the farm can accommodate six students. We have had students here throughout the year. At shearing time we had more than we could accommodate. The students have made good progress with sheep and wool.

STAFF.

When I took over, Mr. A. Souter, the foreman, had resigned. The following comprise the staff on the farm:—

- Mr. J. B. Gildea. Clerk.
- Mr. O. Rivers, Sheepman.
- Mr. M. Delport, Stockman.
- Mr. P. Delport, Foreman.
- Mr. W. Cowie, Handyman.

I am pleased to state that the above gentlemen have rendered good service and have never given cause for complaint.

LIVESTOCK ON HAND IS AS UNDER :

	Total.
Sheep.	
Ewes, 309; rams, 5; lambs, 183; wethers, 7	504
Cattle (Friesland), cows, 15; heifers, 1; calves, 10; bulls (young), 1 ...	27
Cattle (Aberdeen Angus), cows, 13; heifers, 7; calves, 6; and young bulls, 4	30
Oxen	48
Horses, Geldings 5, Mares 5	10
Mules	9

I have the honour to be,

Sir,

Your obedient Servant,

(Sgd.) A. G. MICHAELIAN,

STUD SHEEP FARM, ERMELO, STATEMENT RE.

Farm or Station.	No. of Draught Animals on Farm.	Other Live Stock.	Average No Labourers Employed.	Total No. of Acres.	Total No. of Acres Cultivated.	No. of Experimental Plots laid out.
Stud Sheep Farm, Ermelo.	6 Mares 5 Geldings 9 Mules 48 Oxen	5 Bulls 28 Cows 8 Heifers 16 Calves 5 Rams 309 Ewes 183 Lambs 7 Hamel	35	2,464	200	Nil

STATEMENT OF RECEIPTS AND EXPENDITURE FOR THE FINANCIAL YEAR 1912-13.

Stud Sheep Farm, Ermelo.

[U.G. 47-'13.]

Receipts.			Actual Revenue.			Transfers.			Totals.			
	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.
Sales of Cattle	411	0	9	—	—	—	411	0	9	..
" " Sheep	642	19	10	355	10	04	998	9	10	..
" " Wool	327	13	11	—	—	—	327	13	11	..
" " Skins	7	3	7	—	—	—	57	3	7	..
" " Seed	18	0	0	—	—	—	18	0	0	..
" " Cream	13	10	1	—	—	—	13	10	1	..
" " Mules	—	—	—	100	0	0	100	0	0	..
Hostel Fees	147	14	9	10	0	0	157	14	9	..
Total Revenue 1,568 2 11 465 10 0 2,033 12 11												
Actual Expenditure charged to Vote VII.—												
N. 1 Salaries and Allowances	697	4	0	—	—	—	697	4	0	..
2 Transport and Travelling	135	13	4	—	—	—	135	13	4	..
3 General Maintenance	3,017	19	7	—	—	—	3,850	16	11	..
Total Expenditure 3,850 16 11 465 10 0 4,219 15 5												
Actual Revenue collected and paid to Exchequer 1,568 2 11 465 10 0 3,036 13 11												
Transfers—												
Pothefstroom Stock, £80, Seed, £4	84	0	0	—	—	—	84	0	0	..
Guano Islands, Guano	25	0	0	—	—	—	25	0	0	..
Fencing £186 4s. 5d., Cedara, Wool packs, £13 15s., Forestry Trees, £80	259	19	6	—	—	—	259	19	6	..
Total 368 19 6 465 10 0 833 9 6												
Total £6,253 9 4												

F. B. SMITH,
Secretary for Agriculture.

STATEMENT OF RECEIPTS AND EXPENDITURE.

Shed Sheep Farm, Ermelo -Financial Year, 1912-13.

REVENUE (INCLUDING TRANSFERS),				EXPENDITURE (INCLUDING TRANSFERS).			
	£	s.	d.		£	s.	d.
Sales of Stock	<i>Administrative Charges:</i>			
Student Fees	Salaries ..	..	697	4 0
Sales of Wool	Transport and Travelling ..	..	135	13 4
" Skins				
" Seed	<i>Purchase of Stock:</i>			
" Cream	Horses ..	..	..	80 0 0
				Labour: Wages ..	..	..	1,325 4 10
				<i>General:</i>			
				Sundry Equipment ..	..	120	5 4
				Sundry Stores ..	..	121	13 2
				Implements and Machinery ..	..	227	14 9
				Wagons and Harness ..	..	82	10 10
				Repairs, Farriery ..	..	44	8 2
				Feeding Stuffs ..	..	377	3 6
				Seeds ..	..	150	4 11
				Manures ..	..	100	10 0
				Veterinary Appliances ..	..	6	13 11
				Railage ..	..	142	8 8
				Sundries ..	..	51	4 7
							1,424 17 10
				<i>Entertainment of Visitors</i>	..	..	32 16 0
				<i>Permanent Improvements:</i>			
				Fencing Material ..	..	249	10 11
				Trees ..	..	60	0 0
							309 10 11
				<i>Up-keep of Hostel:</i>			
				Sundry Equipment ..	..	10	16 0
				Provisions, etc. ..	..	203	13 0
							214 9 0
Total Revenue	Total Expenditure ..	..	..	£4,219 15 11

APPENDIX III.

REPORT OF THE DIRECTOR OF VETERINARY RESEARCH FOR THE FIFTEEN MONTHS ENDING MARCH 31st, 1913.

UNION OF SOUTH AFRICA.

Veterinary Research Laboratories,
Pretoria, June 13th, 1913.

The Secretary for Agriculture,
Pretoria.

I have the honour to forward you the 2nd Administrative Report of the Director of Veterinary Research, for the fifteen months ending March 31st, 1913.

The research work that has been undertaken during this period forms the subject of the 2nd Report of the Director of Veterinary Research which has just been published and to avoid needless repetition I am now only briefly referring to the chief matters of interest.

INVESTIGATIONS INTO LAMZIEKTE.

The line of investigations forecasted in my previous report has been adhered to during the past year and, though the Bacteriological aspect has not been prominent in the investigations, it has not been forgotten.

The writer, Mr. Robertson, who at one time was under the impression that he had isolated the causal organism of the disease, has carried out extensive experimental preventive inoculation work in the Bloemhof District and the ensuing season will test its efficacy.

At the various experimental stations the scheme of work suggested by Dr. Theiler is being carried out.

The work of raising various grasses and plants on our experimental camps has not met with much success, chiefly owing to the lack of water, and we are still unable to point to any particular grass or plant which can be held responsible for the disease. I may say, however, that by fencing down our camps at Armoedsvlakte (Vryburg District) we have obtained a case of the disease in a hundred-acre paddock and we have now fenced this area off into five portions of 20 acres each. Should the disease make its appearance in any of these smaller paddocks then a thorough botanical survey will be immediately undertaken.

Just previous to Dr. Theiler's departure for Europe, he published a pamphlet (No. 23 of 1912) entitled "Facts and Theories about Lamziekte and Stijfziekte." In this he entered very fully into our present knowledge of the disease and he suggested that Lamziekte might be due to the cumulative effect of a poison contained in certain hitherto unknown plants or grasses.

As regards the botanical side of the question this has been left in the able hands of Mr. J. Burt-Davy, F.L.S., our Agrostologist and Botanist and the full result of his investigations have been published in the 2nd Report of the Director of Veterinary Research under the title of "Botanical Investigations into Lamziekte."

EAST COAST FEVER.

The method of immunizing cattle against East Coast Fever referred to in my previous report, has been largely adopted for transport cattle in the Transkei, about 159,000 head having been done during 1912.

The practical outcome of the last year's investigations can be summarised as follows:—

- (1) The experience in the field indicates that the inoculation can safely be undertaken in respect of either clean or infected cattle with the prospect of conferring immunity on 56-60 per cent.

- (2) The best results in the field may be expected by the injection of 5cc spleen and gland pulp (medium, half coarse or coarse grain) mixed with Peptone or Aleuronat, such animals to be kept on clean veld for 14 or 15 days before they are exposed to natural infection.
- (3) The immunity conferred by the injection may not be absolute, inasmuch as 12 breakdowns were noted amongst the experimental animals, or 1 per cent.
- (4) The animal which supplied the spleen and gland pulp for the injection has apparently an influence on the results as the variation in mortality from the injection cannot be considered to be due to any other factor.
- (5) As a possible improvement to the present method of immunising cattle against East Coast Fever, the saturation of the pulp in a solution of Quinine Hydro-chloride is suggested, the strength of the solution to be between 0.6 per cent. and 0.7 per cent.

MISCELLANEOUS INVESTIGATIONS.

Mosquitoes of the Transvaal. Mr. F. V. Theobald, F.E.S., of the Wye College, England, was entrusted with the determination and classification of another collection of mosquitoes, and a full account appears in the 2nd Report of the Director of Veterinary Research. Three new species were described and three species previously unrecorded in the Transvaal were detected.

A New Tick. During one of Dr. Theiler's visits to Vryburg he came across a tick new to South Africa (*Ornithodoros megnini*) and, although many of the local residents considered that this would throw some light on the transmission of lamziekte, yet their hopes were not fulfilled when thorough tests were undertaken.

Trypanosomiasis. Mr. A. W. Shilston, M.R.C.V.S., of the Pietermaritzburg Laboratory, undertook some research work in connection with an outbreak of Trypanosomiasis in Zululand and, as a result, there seems to be considerable doubt in regard to the identity of the trypanosome now found in cattle in Zululand with that formerly described by Bruce in 1896 (*T. brucei*, the cause of Nagana). Further investigations are being continued into this matter.

Mr. W. H. Andrews, M.R.C.V.S., devoted some attention to a strain of Trypanosomiasis brought back from Portuguese East Africa by the Commission sent there in 1910, but the use of Arsenophenylglycen, Novoflavin, Salvarsan (606) and combinations with Sodium Arsenite, Tartar Emetic and Atoxyl, failed to produce any beneficial effects on infected animals.

Ostrich Chick Disease. A new parasite (*Leucocytozoon Struthionis*) has been found in ostrich chicks and described by Mr. J. Walker, M.R.C.V.S., of Grahamstown.

Mr. Walker remarks that "So far in South Africa a similar parasite has only been observed in some species of wild birds, e.g. the Hawk, and consequently from an economic point of view its presence was considered of much importance. It will now, however, be necessary to ascertain whether it enters into the etiology of some of the, at present unknown, diseases of ostrich chicks."

Fowl Poisoning. Some interesting experiments have been undertaken by Mr. D. Kehoe, M.R.C.V.S., with the plant called *Cotyledon Orbiculata*, a plant belonging to the same genus as that responsible for the disease in goats known throughout the Cape Province under the name of Nenta (C'Nenta or Krimpziekte).

Although the amount of material available for experimental purposes was very small, and its effect could not be tried on the larger domesticated animals, yet we were able to prove conclusively that the plant is undoubtedly toxic for fowls.

When the plant is again in season and the researches are recommenced, it will be our endeavour to isolate the toxic principle contained in the leaves.

Snake Experiments. A number of experiments were undertaken by Mr. W. H. Andrews, M.R.C.V.S., with the object of studying the effect of snake bites on different domesticated animals.

MICROSCOPICAL AND PATHOLOGICAL ANATOMICAL EXAMINATIONS.

The number of specimens and smears received at Onderstepoort again showed an increase on the previous calendar year, being 6,280 for 1912, as against 5,453 for 1911. In the remaining three months of the financial year of January-March, 1913, the number of examinations amounted to 2,176.

At the Pietermaritzburg Laboratory 2,659 examinations were made and in Grahamstown an increase of nearly 50 per cent. is recorded, the figures for 1912, being 667 as against 375 in 1911.

SERUM FOR THE INOCULATION OF MULES AGAINST HORSE SICKNESS.

An appreciable decrease in the output of serum for the inoculation of mules occurred in 1912, entirely due to fewer demands in the Transvaal.

The distribution was as follows:—

Transvaal Province	1,183 doses.
Natal Province	1,068 doses.
Cape Province	314 doses.
Orange Free State Province	13 doses.
Rhodesia	480 doses.
Swaziland	13 doses.
Mozambique	60 doses.
Belgian Congo	6 doses.
	<hr/> 3,137 doses. <hr/>

The issues within the Union, account for the inoculation of 1,884 mules, of which 59 died, representing a mortality of 3.1 per cent.

Inoculation of Horses against Horse Sickness. As stated in my last report the initial experiment proved to be fairly satisfactory, but the question of immunity has still to be settled. Up to the end of the financial year (March 31st, 1913) 608 horses had been inoculated, of which 70 died, representing a mortality of 11.5 per cent.

Black Quarter Vaccine (Sponsziekte). The total issued from Onderstepoort for the fifteen months amounted to 311,170 doses (including both "Single" and "Double" Vaccines); about three-quarters of the output was prepared in Grahamstown.

Blue Tongue Vaccine. The vaccine is prepared entirely at Onderstepoort and during the 15 months under review the issues amounted to 657,948 doses.

Vaccine Lymph. This is also prepared at Onderstepoort. From January 1st, 1912, to March 31st, 1913, 725,686 doses were issued.

Redwater and Gallsickness Vaccine. 6,673 doses were issued from the Grahamstown Laboratory and 3,117 doses from Onderstepoort. In addition 739 cattle belonging to private owners were inoculated at the Grahamstown Laboratory.

Mallein. This is prepared at Grahamstown Laboratory. From January 1st, 1912, to March 31st, 1913, 18,065 doses were issued.

Miscellaneous Laboratory Preparations. In addition to the vaccines, etc., prepared in this Division, supplies of Anthrax and Tuberculin are obtained from Europe, and issued on demand.

The following are the figures relating to the issued of these materials:—

Anthrax	87,475 doses.
Tuberculin	12,558 doses.

Publications. The following articles have been published in the Agricultural Journal:—

By DR. A. THEILER.

Experiments to determine the safe dose of White Arsenic, Cooper's Dip and Bluestone for Sheep.

Facts and Theories about Lamziekte and Stijfziekte (four parts).

The transmission of Gall Sickness by Ticks.

Gallsickness of Imported Cattle and the Protective Inoculation against this Disease.

Anthrax in the Ostrich.

Inquiries into Dips and Dipping in Natal.

Interim Report *re*-dosing of Sheep with Cooper's Dip and Bluestone under the conditions of a sourveld farm.

Wireworm in sheep and their treatment.

By W. ROBERTSON.

Immunisation of South African Born Cattle against Redwater from a Practical Standpoint.

[U.G. 47 1913.]

The following articles by other members of the Staff have been contributed, viz:—

A note on the occurrence of *Aspergillus* in the Ostrich, by James Walker, M.R.C.V.S.

Methods of sero-diagnosis applicable diseases of stock in South Africa, by D. Kehoe, M.R.C.V.S.

Transactions of Royal Society of South Africa.

INTERVIEWS AND CORRESPONDENCE.

During the period under review the number of letters and telegrams dealt with amounted to 53,216, the allocation being as follows:—

	Received.	Despatched.
Onderstepoort	21,085	20,621
Grahamstown	3,352	3,874
Pietermaritzburg	2,190	2,094
Total	26,627	26,589

STAFF.

Dr. Theiler went on leave in September, 1912, and is spending his vacation in Europe in study. During this period Mr. W. Robertson has been acting as Director of Veterinary Research.

Messrs. Jowett, F.R.C.V.S., and N. Hall, M.R.C.V.S., joined the Staff of the Division during the year; the former was subsequently transferred to the Veterinary Division.

The Staff of the Division comprises the Director and Assistant Director, with nine professional officers, one superintendent, ten clerks with a librarian and store-keeper, 19 lay assistants, 13 other European employees and 256 natives.

FINANCE.

The expenditure for the financial year amounted to £54,266 8s. 8d., and the revenue to, approximately, £9,000.

GRAHAMSTOWN AND PIETERMARITZBURG LABORATORIES.

Reports by the officers in charge of the above-mentioned Laboratories are attached.

WILLIAM ROBERTSON,
Acting Director of Veterinary Research

UNION OF SOUTH AFRICA.

Veterinary Research Department,
Grahamstown, 16th May, 1913.

The Acting Director of Veterinary Research,
Pretoria.

I beg to submit the following report for the period 1/1/12—31/3/13:—

During the Acting Assistant Director's absence on leave September, 1911, to February, 1912, I took charge of this Laboratory, and on his transfer to Headquarters in August, 1912, I again took over charge of this station.

The work comprised the following:

- (1) The collection, packing, and issue of Redwater-Gallsickness Vaccine;
- (2) The preparation, packing, and issue of Sponsziekte Vaccine;
- (3) The issue of Mallein and Anthrax Vaccine;
- (4) The immunisation on the station of imported pedigree and pure-bred Colonial cattle belonging to various owners, against Redwater-Gallsickness;

- (5) The inoculation of ordinary cattle on the station against Redwater-Gallsickness;
- (6) Redwater-Gallsickness experiments for supply of Vaccine for issue;
- (7) Ostrich Chick Diseases Investigations;
- (8) Ostrich Chick Field Experiments;
- (9) Hatching and Rearing of Ostrich Chicks for experimental purposes;
- (10) Field experiments in connection with Lamziekte in cattle;
- (11) Feeding experiments in connection with Lamziekte in cattle;
- (12) A free daily clinique, 9-10 a.m.
- (13) Correspondence;
- (14) Examination of blood smears and specimens sent in by various owners;
- (15) Advice to owners, either by correspondence or personal interviews, in connection with Stock Diseases.

1. Redwater Vaccine issued 6,673 doses.

2. Sponsziekte Vaccine issued 228,840 doses (134,000 to Pretoria).

3. Mallein issued 11,050 doses; Anthrax Vaccine issued 70,500 doses.

4. Owners frequently send valuable cattle to the station for immunisation against Redwater-Gallsickness; on arrival they are put under observation and inoculated and handed over to the owner on recovery. The results have been satisfactory. It has frequently been found that cattle do not react to one or even more injections of Redwater Vaccine, and consequently the advantage of noting whether a reaction has occurred prior to their being allowed to run on a Redwater farm is obvious.

(5) During the period 739 ordinary cattle were inoculated with Redwater-Gallsickness Vaccine at the Station and handed over to the owners after inoculation.

(6) Several imported Hereford Cattle have been put in experiment for the purpose of obtaining a strain of Redwater-Gallsickness Vaccine which will confer immunity without causing a severe reaction.

(7) *Ostrich Chick Diseases Investigations.*

Particular attention has been given to the diseases of the ostrich, more particularly those found to occur in chicks:—

- (i) Leucocytozoon Struthionis Infection;
- (ii) Aspergillus Infection;
- (iii) An, at present, unnamed disease sometimes termed Chick Fever, characterised by the presence of nodules in the following positions: mouth, nostrils, tongue, oesophagus, trachea, probably in the liver, alimentary canal, and rarely in the spleen.

A number of sick or dead ostriches were sent in by owners. Post-mortem examinations were made in 79 instances.

(8) A field experiment has been in progress on Table Farm, owner C. White, Esq., since July, 1912. A number of chicks were hatched at the Field Laboratory, these were run in a camp reputed to be unhealthy for chicks owing to the occurrence of a disease commonly known as Chick Fever or Yellow Liver. No cases of chick fever having occurred amongst the experimental chicks which have been running in the reputed unhealthy camp.

(9) Several incubators were obtained for the supply of ostrich chicks for experimental purposes, and some breeding sets of ostriches were camped off on a farm close to Grahamstown for the purpose of obtaining a supply of eggs.

Owing to the remarkably dry season considerable difficulty has been experienced in obtaining a supply of eggs. Owners were invited to supply eggs from wild birds at the rate of 1s. each, very few were however obtainable.

The following farms were visited in connection with ostrich diseases investigations:—

- (i) Prospect, Bedford District;
- (ii) Grootvlei, Alexandria District;
- (iii) Island View, Alexandria District;
- (iv) Culmstock, Middelburg District (Cape);
- (v) Conway, Middelburg District;
- (vi) Bowden Hall, Middelburg District.

(10) Two Field Experiments in connection with Lamziekte in Cattle are in progress on the following farms:—

- (i) Sevenfountains, Albany District (known as Emslie's Experiment).
- (ii) Nurney, Monley Flats, Albany District (known as Mountfort's Experiment).

The Lamziekte Experiment at Yarrow was discontinued in April, 1912.

Sevenfountains (Emslie's Experiment): This experiment was started in April, 1912; 25 cows and heifers are run in a badly infected Lamziekte camp, 12 of these were inoculated with Pasteurella Toxine, the remainder as controls.

Results to date have been as follows:—

- 2 died Lamziekte.
- 1 died Heartwater;
- 1 died Obstruction of Oesophagus;
- 1 died Parasitic Enteritis;
- 2 died cause?
- 6 showed premonitory symptoms of Lamziekte, but recovered.

Nurnley (Mountfort's) Experiment: This experiment was started in May, 1912. 24 head of cattle are run in a camp on this farm in which cases of Lamziekte occur. The results to date have been as follows:—

- 5 deaths occurred from Lamziekte;
- 1 death occurred from Metritis;
- 1 death occurred from Fracture of Neck;
- 1 death occurred, cause?
- 2 animals were noticed sick with premonitory symptoms of Lamziekte, but recovered.

(11) Feeding Experiments in connection with Lamziekte in cattle. This experiment was commenced on 15.6.12. Ten head of cattle were put in experiment and have been fed on dried veld hay collected from the same camp in which the 24 head of experimental cattle at Nurney are grazing. The results have been as follows:—

- 3 died from Debility and Poverty.

A further lot of four cows in calf were obtained and have been fed on veld hay exclusively from the above camp. Results to date:—

- 2 died of Poverty;
- 2 remain apparently healthy, but have lost condition.

(12) Number of Clinique cases attended to since June, 1912, 650.

(13) Letters and telegrams received 3,352; Letters and telegrams answered 3,874.

(14) Examination of blood smears and specimens 667.

JAMES WALKER,
for Actg. Asst. Director of Veterinary Research.

UNION DEPARTMENT OF AGRICULTURE.

REPORT OF THE ACTING DIRECTOR OF VETERINARY RESEARCH.

Veterinary Research Division,
P.O. Box 405,
Pietermaritzburg, 3rd May, 1913.

Director of Veterinary Research,
Pretoria.

REPORT 1912-1913.

I have the honour to submit a short Report relative to the Veterinary Research Laboratory, Pietermaritzburg, for the year 1912-1913.

Lt.-Col. H. Watkins Pitchford, F.R.C.V.S., remained in charge of the Laboratory until the end of April, 1912, when he retired from the Government Service. The investigations in connection with East Coast Fever, the process of infection by the tick and the effects of short interval dipping, were continued up to the time of his departure; the results obtained were embodied in his last report and also in a lecture delivered at the Agricultural Conference held in Pietermaritzburg.

The necessity for the continuance of the Natal Veterinary Research Laboratory being recognised, it was decided to have all the buildings repainted and placed in thorough repair. This work was satisfactorily carried out under the supervision of the Public Works Department, being completed in January, 1913.

The issue of the various vaccines and sera supplied by the Division, and the microscopical and pathological examination of slides and specimens, constitute an important part of the routine work of the Laboratory; the majority of the slides and specimens are received from the Veterinary Department, but many farmers forward them direct to the Laboratory and, although the outbreaks of East Coast Fever in Natal are rapidly diminishing, there is no marked falling off in the number of slides received; this is largely owing to the fact that farmers are increasingly recognising the value of blood examination in all cases of sickness in stock and, as a result, numerous cases of Anthrax, Redwater-Gallsickness, etc., are diagnosed, thus allowing of suitable protective measures being taken.

The total number of examinations made during the 12 months ending 31st March, 1913, was 2,659.

A large number of enquiries were received from farmers in regard to stock diseases, dipping, vaccines, etc. In all 2,190 letters and wires were received and 2,094 despatched during the year.

Mr. D. S. Robertson, who had been clerk at the Maritzburg Laboratory for four years, was transferred to the Pretoria Office in December, 1912, and Mr. P. C. Blanchflower was appointed as a temporary clerk in his place.

For several years the preparation of Antivenomous Serum was undertaken at the Maritzburg Laboratory by Lt.-Col. Watkins Pitchford, and its value in the treatment of snake bite was widely recognised; the quantity available was, however, small and at the close of the year 1911 its issue was discontinued.

At the beginning of June, 1912, the immunisation of horses against the venoms of South African snakes was recommenced on a larger scale and, although the process is exceedingly slow, a fair number of doses were issued during the year, and several reports have been received from Medical men and others of the successful treatment of cases of snake bite by injection of the serum.

The specific nature and antitoxic value of the serum against the various venoms employed in its preparation have been fully demonstrated by experiments in the Laboratory.

It is hoped that in future a constant supply will be maintained, and the need for a reliable agent in the cure of snake-bite met, by bringing the Antivenomous Serum more to public notice.

One of the chief investigations undertaken has been the study of scab in sheep; the life history of the causal parasite has been found to differ in several essential points from the accounts given by observers in other countries and these have an important bearing on the question of eradication of the disease. Observation on the effects of various dipping agents on the parasites have been made and others are still in progress.

A strain of Trypanosome from Zululand has been studied and a report on the subject submitted; further investigation is necessary into this important group of diseases.

During the year feeding tests with suspected poisonous plants and several small investigations have been carried out. In connection with some of these enquiries I have made short visits to farmers in different parts of the Province, obtaining information on the spot and in many cases bringing back material for further research at the laboratory.

I have the honour to be, Sir,

Your obedient Servant,

A. W. SHILSTON, M.R.C.V.S.

APPENDIX IV.

DIVISION OF DAIRYING.

ANNUAL REPORT FOR THE 15 MONTHS ENDING 31st MARCH, 1913.

Department of Agriculture,
Pretoria.The Secretary for Agriculture,
Pretoria.

Sir,

I have the honour to present my second Annual Report under Union, for the period ending 31st March, 1913.

OFFICE WORK AND GENERAL CORRESPONDENCE.

This shows a considerable increase, being 3,473 letters despatched and 2,074 received, or an increase of 1,626 despatched and 714 received, as compared with the previous twelve months, and I would point out that, if the correspondence continues to increase at the same ratio during the coming twelve months, it will be impossible to cope with it unless additional clerical assistance is forthcoming, more especially in view of the fact that the technical staff is likely to be considerably augmented in the near future.

STAFF CHANGES.

Mr. V. G. Zahn was appointed as Junior Dairy Instructor on the 1st January, 1913, his headquarters for the present being at Pretoria, but a considerable portion of his time is being devoted to Natal where, I hope eventually, to establish a resident Instructor. He has had considerable experience in Cheese-making under South African conditions, and his appointment to the Division will very materially assist in coping with the numerous requests for instruction in that particular branch of dairying.

Several changes in regard to my clerical assistance have taken place. Mr. Naude was appointed to the Entomological Division, being replaced by Mr. Mussman from the Sheep Division, who, however, was subsequently retransferred to that Division and was succeeded by Mr. A. Hosking from Elsenburg College. It is to be hoped that these frequent changes will be avoided in the future, as it takes a clerical officer, however competent he may be, a considerable time to become thoroughly acquainted with the various duties entailed in a Division of this nature. In this connection I would draw attention to the fact that the principal reason for these numerous changes is due to the lack of any opening for promotion, and would again strongly urge that the status of the Clerk in this Division be raised to a first grade one, and thus ensure the retention of the services of a good reliable officer, as it cannot be denied that this Division is expanding, and will continue to do so in the future. I trust, therefore, that my recommendations in this respect will receive your earnest consideration.

FIELD WORK.

A great deal of my time was spent away from headquarters, and long tours had to be undertaken in the various Provinces in the Union. This naturally caused unavoidable delays in dealing with office matters, but since approval has been obtained for the appointment of a Senior Inspector to be stationed in Pretoria, the difficulties experienced in keeping office work up-to-date should in a great measure disappear.

All the officers of this Division were kept fully occupied during the period under review, but a great deal of spade work has still to be undertaken before satisfactory progress can be reported. The work of this Division would be greatly facilitated if the various Farmers Associations in the Union would advise me from time to time when they consider a Dairy Instructor is required in any particular district, so that those farmers who are already engaged or intend starting dairy

operations can be assisted in every way possible. I have received several complaints that certain districts have been very much neglected, but in nearly every instance I found, on investigation, that no direct application had been made for the services of an Instructor, although, no doubt one was required, and would have been sent at the first available opportunity had application been made.

AGRICULTURAL SHOWS.

Arrangements were made for an officer of this Division to be present at nearly all the Shows held in the Union, and a few Shows which were not visited, were omitted owing to the clashing of dates, and no officer being consequently available.

Great improvement was noticeable at all the more important Shows, and the quality of stock exhibited, showed, in most instances, a marked improvement on former years.

CREAMERIES AS EXISTING AT THE PRESENT TIME.

In my last Annual Report, I deemed it necessary to utter a note of warning in regard to the tendency to erect a Creamery in districts already catered for, and where sufficient supplies were not forthcoming to make such Creameries a payable proposition. This note of warning would appear to be even still more necessary during the present history of Creamery development in South Africa. The fierce competition which has prevailed in many parts of the Union during the past fifteen months, and in consequence the far too high prices paid for the raw material, has been mainly responsible for some of the Creameries finding themselves in anything but a satisfactory condition at the present time.

In the case of the Heilbron Creamery, which has been obliged to go into liquidation, I do not propose to discuss in detail all the causes which lead up to the position in which this Creamery at present finds itself, as no good purpose would be served by doing so. At the same time, keen competition, lack of support by the original shareholders, and running expenses too high in comparison with the output of butter, have all assisted in forcing this Creamery into its present position. All this points to the absolute necessity of thoroughly investigating in every detail the essential principles which must be established before the erection of further Creameries can be considered. The essential principles necessary are, first, the whole-hearted support of the farmers in any district where a Creamery is proposed to be established, and secondly that sufficient supplies are forthcoming, without unduly encroaching on Creameries already existing. To erect further Creameries on lines which do not embody the above principles simply means courting disaster and fresh failures.

When the Dairy Division is approached in regard to the erecting of a new Creamery, and it is found, after investigation, that such a Creamery is necessary, and likely to meet with a fair measure of success, then every assistance is given to help the scheme forward. On the other hand, should it appear palpable that no such Creamery is justified by local conditions, then it is the obvious duty of this Division to fearlessly state so; but should it be found that, in spite of advising against the scheme, the prompters still decide to proceed with the same, then it is equally obvious that this Division must render all the assistance possible in order to carry out the scheme on economical and up-to-date lines.

This is broadly the policy which I have personally been working upon in the past, and it is the policy which I intend the Division to pursue in the future, when dealing with further Creamery developments. Turning to the quality of the butters produced this season, as compared with last season's output, I regret to say that there is a slight falling off, due in many instances to the want of stricter and better grading of the cream; also a considerable quantity of butter was stored for a protracted period, which in my opinion was not suitable for storing for any length of time. Unevenness in colour was more pronounced this season than last, and buttermakers who are using the combined churns and workers should exercise more care, especially in regard to the temperatures they use for churning and washing the butter. A good deal of experience is required to successfully handle the combined churns and workers, and I have frequently noticed a tendency to either overwork or underwork the butter in them.

THE QUESTION OF SUITABLE BUTTER-BOXES.

This becomes more serious every year, and the prices which creameries have to pay for good Asutranian boxes increase rather than decrease. When storing

butter for any length of time, Australian boxes are unquestionably the best, but when it is found necessary to store butter in boxes of inferior quality, then I strongly advise the sides of such boxes being coated with paraffin-wax.

MOULD IN BUTTER.

This appears to be getting worse rather than better, and every means available should be taken to keep Creameries free from mould spores, as when a building once becomes badly affected, it is very difficult to get it right again. When freezing rooms become infected with mould, fumigation with formaldehyd gas seems to have a beneficial effect, and if the rooms have concrete floors, these should be cleansed with a solution of corrosive sublimate to which a small quantity of spirits of wine has been added. The Division of Plant Pathology and Mycology have kindly undertaken to carry out some investigation work in regard to the various sources whence butter may become infected, and when these investigations are complete, the information gained will no doubt be made public.

PRESENT STATE OF THE BUTTER MARKET.

It is very difficult to estimate what the market is likely to be towards the end of the winter, as so much depends on whether we have an early season or not. Still more difficult is it this year for the various Creameries to know when to off-load the stocks they have on hand, as in spite of the severe drought experienced at the beginning of the season, more butter has been turned out this season than last, and there is every indication of fair supplies being produced during the winter months. There is an increase in Creamery butter in the Orange Free State alone of 705,667 lb., as compared with the corresponding year of 1911, and the Cape Colony shows an increase in Creamery butter of 492,681 lb.

In addition to this 703,972 lb., more butter was imported in 1912 than was the case in the corresponding year of 1911. This all points to the difficulties experienced in controlling the law of supply and demand, and either less butter will have to be imported, or else an export trade will have to be organised here during a certain portion of the year.

TRIAL SHIPMENT OF BUTTER TO LONDON.

A trial shipment of butter was sent during January, 1912, to the London market, the butter being supplied by three Creameries in the Orange Free State.

Arrangements for sending this shipment to London were made by a private firm, but this Division had the consignment in question thoroughly examined before it left Durban, and also inspected the accommodation provided in the steamer which conveyed same to England. Two modern refrigerating cars were utilised to convey the butter to Durban and the butter, when placed on the boat, was in good condition.

The Trades Commissioner in London reported that all the butter was sold and good prices obtained, no complaints having been received from the various purchasers, so apparently they were quite satisfied. It must not, however, be lost sight of, that the butter market in England at that time was very firm.

COMPARATIVE IMPORTATIONS OF BUTTER FOR 1912 AND 1911.

Year.								Weight.	Value.
								lbs.	£
1912	..	..	..	..	..	..	..	4,925,188	262,402
1911	..	..	..	..	..	..	..	4,221,216	192,987
Imported re-exported to Territories outside the Union								1912	203,639
" " " " 1911								398,553	18,778

The above figures are interesting, and, as already stated, show a large increase over importations of 1911, in spite of the fact that we produced considerably more Creamery butter this season than last.

[U.G. 47—'13.]

BETTER FACILITIES NEEDED ON SOUTH AFRICAN RAILWAYS.

In reviewing the facilities offered by the Railway Administration during the past season, I regret that these were in no way satisfactory. Most of the new refrigerating cars which were not available for the previous season, were ready for use this season, and had been allotted to the various Creameries according to their requirements. However, owing to the severe drought which set in, the butter season was very late in starting; consequently the allotted cars were not utilised to their full extent. This led to many of the cars being removed and utilised for other purposes. When the butter season did actually start in earnest, many Creameries were without a car at all, and when they did receive one, in many instances they were quite unsuitable for the conveyance of dairy produce. Complaints reached me from all directions, more especially from the Eastern Province, where butter was being forwarded to Cape Town and arriving there in a shockingly melted and damaged condition. This I personally verified on several occasions, and a good quantity of butter which was first grade when despatched, could only be sold as second and in some instances third grade on its arrival, thus entailing severe losses to the Creameries involved. Furthermore, many of the new cars which were intended for the conveyance of dairy produce only, have been used for the fish traffic. This fact I have frequently personally verified, and I have also been present at different Creameries when a refrigerating car has arrived, and on opening the doors of same, the stench inside was quite enough to knock anyone over. It is wrong to convey butter to the market in cars of this description, and I hope that most stringent measures will be adopted to prevent a recurrence of such a state of things during the coming season.

Great carelessness is still in evidence in regard to the handling of milk and cream in transit. Granted more shade houses are sadly needed, yet I frequently observed milk and cream exposed to the full rays of the sun, when there were several shady spots which could have been quite conveniently utilised. To the lay mind this may seem quite a trivial point, but the trained Creamery Manager knows full well when he receives this overheated cream, that he is only able to produce a second-class article from the same, although the cream may have been first grade when it left the supplier. There must be to a certain extent a give and take policy adopted, and in order to place the Dairy Industry on a proper footing, the Railway Authorities must make certain sacrifices, and not view everything on a purely financial basis. For example, when a Creamery has a car conveying consignments of butter away, say twice a week, it is obviously impossible to fix a minimum quantity which the car should carry as so much depends on the state of the various butter markets. Some weeks the cars will be utilised to their utmost capacity, but should a Creamery be advised by its Agent that the butter markets are congested, then it would be a foolish policy for any Creamery to continue to send full car loads away simply to pay Cold Storage charges until the markets improve. On the other hand I do not consider it fair to remove a car from any particular Creamery simply because a periodical hiatus is created owing to the varying state of the butter market.

I have felt obliged to bring these matters to your notice somewhat at length, as the future success of the Dairy Industry depends in a great measure on better railway facilities being provided than exist at the present time.

GENERAL OBSERVATIONS.

Speaking generally, the Dairy Industry at the present time requires to be most carefully watched, also assisted and protected in every way possible. One of the matters which require immediate attention is a more comprehensive Food Adulteration Act, with full powers to prevent fraudulent dairy products competing with the genuine article. Take one example only, all butter substitutes, milk-blended butter, etc., which cannot comply with the standard laid down for pure butter, should be sold under the heading of Margarine. To enable these to be carried out, a uniform Act applicable to the whole Union is highly essential instead of the varying laws which are in force in the different Provinces at the present time.

The Cheese-making Industry is progressing favourably and several new Factories have been started during the last season. Although the progress is satisfactory, still the quality of some of the cheese turned out needs improving, and now that my staff will be increased in the near future, special attention will

be given to this work. Investigations are still being carried out in regard to a peculiar formation of Red Spots which made its appearance in several Cheese Factories in East Griqualand during the last two years. Results of these investigations will be published at a later date. I would also bring to your notice the urgent necessity for establishing an Agricultural Statistical Bureau for the Union in view of the great difficulty experienced at present in collecting reliable data.

On the 31st March, 1913, the Staff of the Division comprised the Superintendent, with five Inspectors with headquarters as follows:—Two at Pretoria, one at Bloemfontein, one at Cape Town and one at Queenstown.

Mr. Carruthers, stationed at Cape Town, resigned at the end of April, but Mr. Gow has been appointed in his place.

I have the honour to be,

Sir,

Your obedient servant,

ED. O. CHALLIS

Superintendent of Dairying.

Department of Agriculture,
Cape Town,
30th April, 1913.

The Superintendent of Dairying,
Pretoria.

Sir,

I herewith beg to submit my report for the above period. Both myself and Mr. Schmolke were very busy for the first four months of 1912, in instructing farmers and attending shows.

CHEESE.

Acting on your instructions I visited all the cheese factories in East Griqualand in the month of January and the following is a list of the places where instruction in cheese-making was given in this district.

R. Cole, Llewellyn, P.O. Franklin.
C. Gunther, Assaburg, P.O. Kokstad.
Mrs. Carter, Compensation, P.O. Matatiele.
G. W. Young, Wanstead, P.O. New Amalfi.
J. T. Moxham, Sandflats, P.O. Strydfontein.
C. Strachan, Flitwick Grange, P.O. Zwartberg.

The quality of the cheese made in this district is excellent, and this is due to the great care and attention which the farmers give to their cheese-making and also to the fine climate. I also experimented on the dipping of cheese in paraffin wax on the farms of Messrs. Cole, Young and Strachan. These experiments proved to be very successful, except that about three weeks after dipping the skins became covered with red spots. The quality of the cheese was excellent and an improvement on those which had been coated with lard, but these red spots spoilt the market value. Later on in the season, and before cheese making was started again I fumigated the curing rooms, but this did not seem to have any effect; because later on when I tried the same experiments this red mould broke out again. I tried the experiments on the same farms and also Mrs. Carter's and even on the latter one the red mould appeared.

The farmers in the Kokstad district were very anxious to have a cheese factory, and they tried to form a limited company. This, however, they could not manage, and so six of the biggest milk producers started a factory themselves. This factory has proved a success and during the season about 400 lbs. of cheese was made per day. They were not able to start cheese-making at this place, however, till the beginning of December, 1912. About this time, two more cheese factories started, viz., Mr. Greyling, The Crown, P.O. Strydfontein and Mrs. Whitelock, P. O. Newmarket. I visited East Griqualand again in October of 1912, and January of this year and gave instruction on the cheese making farms. I think that the

time has now come, when there should be a Dairy Instructor for East Griqualand, with his headquarters at some central place. This district is going ahead very rapidly, as far as dairying is concerned, and if a Dairy Instructor were stationed there, he would be kept busy all the year. It is impossible for an instructor whose headquarters are at Cape Town, to attend to the dairying in such a large province as the Cape and also East Griqualand.

I am glad to be able to inform you that another cheese factory has been started in the Barkly East district. It belongs to Mr. Powrie of Grootvlei, Barkly East and I think it will be very successful. I visited this dairy and gave instruction and also The New England Dairy. This latter place is also going ahead and about 500 lbs. of cheese is being made per day as well as a large quantity of butter.

The output of cheese for season 1912-13 will be rather small. This is due to the extremely bad season last spring, it being well into December before cheese making on most of the farms was started.

BUTTER.

As my time was spent mostly in instructing in cheese making, the greater part of this work was left to Mr. Schmolke. In June of 1912, however, I visited a great many of the farms in the Sandflats district. In this district nothing else but butter is made and it is mostly all sent to the Port Elizabeth market. The quality of the butter is on the whole excellent, and great interest was shown by the farmers while they were being instructed. In view of the fact that so much butter is made in this district I think greater attention should be given to the farmers than has been done in the past. I also visited some of the farms in the Somerset East district to give instruction in butter making. I must say that the butter made in his district is very excellent, the flavour and the colour being specially good.

In September of 1912, I gave instruction on butter making and general dairying, to the Agricultural class at St. Andrews College, Grahamstown. This class was a very successful one, and the boys showed great interest in the instruction given. I hope that a similar class will be given at this college every year, as the instruction given, does the boys a great deal of good when they start on farms afterwards.

Acting on your instructions I obtained as far as possible the amount of butter which was made in the Cape Province during the year 1912, and the following are the figures.

SUMMARY OF BUTTER SALES IN CAPE PROVINCE, 1912.

Sold on Markets and obtained direct from the Farmers	960,394 lbs.
Sold by Merchants and obtained direct from the Farmers	97,179 lbs.
Produced by Creameries	1,443,080 lbs.
	<hr/>
	2,500,653 lbs.

An allowance of 10 percent. has been made on returns received from Market Masters and Merchants to cover returns not sent in. This shows an increase over the returns of 1911 of 59,768 lb. as sold on the markets and obtained direct from the farmers; 492,681 lbs. as produced by Creameries, and a decrease of 57,615 lbs. as sold by Merchants and obtained direct from the farmers. I would point out, however, that although an allowance of 10 per cent. is shown on returns sent in by Merchants, this may possibly be too low, and would account for the large decrease.

MILK TESTING.

A great deal of interest is being shown in this by the farmers and it ought to be encouraged. I tested herds in the Sandflats, Alice, Molteno, Tafelberg and Stormberg districts. Some of the farmers went so far as to purchase milk testing outfits with the intention of carrying out the work themselves.

SHOWS.

During the show season of 1912, I judged at the following shows:—Rosebank, Middelburg, Molteno, Aliwal North, Grahamstown, Port Elizabeth, Kokstad, and Matatiele. I also attended Robertson show for the purpose of giving a lecture

and demonstration on butter making. The quality of the butter at the above shows was very good, but a great many exhibits showed salt and curd streaks, due to not washing and working the butter properly.

In 1913 I judged at the following shows:—Beaufort West, Rosebank, Middleburg, Molteno, Aliwal North, Grahamstown, Port Elizabeth, Kokstad, and Matatiele. The butter at all these shows was a marked improvement on last year, and there were very few streaks. In future I think all dairy instructors that act as judges at the various shows, should be in attendance during certain hours of the show days, to answer questions about the exhibits and give advice to the exhibitors. This, in my opinion, will do more good than a lecture at most of the shows.

GENERAL.

In August of 1912 I attended the farmers congress at Vryburg, and also the annual meeting of the Cape Judges' Association held at East London.

In closing I would recommend that more Dairy Instructors be appointed. The dairying of the Cape Province is going ahead very fast, and it will soon be impossible for two men to do the work. At present two are stationed in the Cape Province and far too much time is spent in travelling from one place to the other. In my opinion the Cape should be divided up into circles and a dairy instructor appointed in each one. If this is done, more work will be got through and the instructor will be able to get better acquainted with the farmers of the district.

I am,

Yours faithfully,

THOS. R. D. CARRUTHERS.

Dairy Inspector.

Department of Agriculture,
Bloemfontein, 25th July, 1913,
as at 31 March, 1913.

The Superintendent of Dairying,
Pretoria.

As requested by your telegram D. 948 of 23rd inst. I beg to submit the following as my Annual Report covering the period of 15 months ending 31st March last, to be substituted for Annual Report dated and submitted in January last.

RETURNS.

Although the year 1912 opened most promising with every prospect for an exceptionally good year throughout, a severe drought was experienced from about August onward to date hereof, occasioning a great and severe set back to the Industry. The total rainfall in December, 1912, and first three months of this year being insufficient to compensate for damage and losses suffered during the drought, thus practically compelling many farmers to relinquish dairying. Yet, notwithstanding these drawbacks and difficulties the returns compiled by me for 12 months ending 31 December, 1912, and attached hereto, show a considerable increase over previous years.

The actual production for the three months ending 31st March, 1913, exceeds that of previous years and given a good year it is anticipated that the total production will nearly double that of 1912.

CREAMERIES.

Creameries established during the period are:—

Nels Rust, Kronstad branch in February, 1912;
Union Industries, Parys, in May, 1912;
Bloemfontein Co-operative Dairy Co., in December, 1912;
Winburg Co-operative Creamery Co., in December, 1912;

and proposed Co-operative Creamery at Springfontein now in course of erection to be completed in May next. This brings the number of Creameries, operating in this Province, to thirteen.

[U.G. 47—'13.]

The manufacture of Cheese should be undertaken only during summer months when surplus or a large supply of milk is plentiful and returns for Cream are low; it is not wise to attempt or continue manufacture during a spell of drought when prices for cream have averaged 1s. 3d. per lb. for superfines.

COW TESTING.

Quality of Products is, in the average, not so good as 12 months ago. This is due chiefly to the drought and ill-feeding of stock, also to the quality and grading of cream mentioned previously. The averaged prices for butter during 1912 were slightly over 1s. 4d. per lb. the price of cream averaging 1s. 1d. per lb. fat content.

No. of Cows tested, irrespective of tests at shows ...	...	2,673
" " Cream samples tested ditto ...	...	155
" " Milk " " ...	...	112
" " Butter " " ...	...	34
" " Cheese " " ...	...	9
" " Shows attended ...	...	20
" " visits of instruction and advice ...	...	110
" " " " inspection and investigations, etc., excepting attendance at head Office ...	...	59
" " addresses and lectures delivered at meetings etc ...	...	33
" " demonstrations given ...	...	13

Dairy Inspector, O.F.S.

COLD STORES, VRYBURG. PROFIT AND LOSS ACCOUNT, 1912-13.

	£	s.	d.	£	s.	d.	By Revenue accrued during period	£	s.	d.	£	s.	d.
To Salaries and Allowances	..	..	..	..	..	..	..	..	..	..	..	..	..
" Working Expense—													
Labour	..	..	..	220	12	5					464	9	4
Fuel, Water, Ammonia, etc.	..	..	..	305	15	9							
Upkeep of Machinery, Tools, etc.	..	..	..	107	10	4					838	6	7
				633	18	6							
Less amount chargeable to Capital Account	..	..	..	27	13	0							
8 % on Capital value of Plant and Buildings	£3,205	19	9	256	9	7							
4 % Interest on Capital	..	..	..	140	0	10							
				396	10	5							
				£1,302	15	11					£1,302	15	11

APPENDIX V.

COLD STORES AND ABATTOIRS DIVISION, NATAL.

Secretary for Agriculture.

The following report for the period 1st January, 1912—31st March, 1913, is submitted:—

Staff.—In accordance with the decision to discontinue the Abattoirs, the Corporations of Pietermaritzburg and Durban took over these concerns in the respective towns on the 24th March, 1912.

On the 1st January, 1912, the following Officers comprised the Staff of the Cold Stores at Pietermaritzburg:—

1. J. M. Winter, Manager;
2. R. A. Robertson, 1st Engineer;
3. T. C. Wood, 2nd Engineer;
4. P. Harrod, Clerk and Storeman;

and no change took place in the period under review with the exception of a reduction in the salary of the Clerk and Storeman, P. Harrod, which took effect from the 1st April, 1912.

ABATTOIRS: PIETERMARITZBURG AND DURBAN.

The buildings and plant at both places were in a satisfactory state of repair and efficiency when handed over to the Municipalities of the respective places, but the sanitary conditions of neither Abattoir could be regarded as satisfactory, Pietermaritzburg particularly.

The number of animals dealt with for the period, that is, from the 1st January, 1912, to the 24th March, 1913, were as follows:—

At Pietermaritzburg	...	...	942 cattle.	—	sheep.
At Durban	...	...	4,806 cattle.	2,675	sheep.

COLD STORES: PIETERMARITZBURG.

Early in the period under review, Government decided to maintain the Cold Stores for another year in order to see what use would be made of them by Agriculturists, but it should be remembered that the consequent uncertainty of the continued existence of the Stores had a most detrimental effect on the revenue earnings, as the usual and most valuable supporters of the Stores thought it advisable to make use of the other Cold Storages, which could provide accommodation for indefinitely long periods.

The buildings and plant were maintained in a high state of efficiency and repair. Two new pumps were installed with very satisfactory results both as regards efficiency and economy.

The following services were rendered during the period of 15 months:—

Articles.						Received.	Delivered.
Beef	..	..	..	Qrs.	..	1,495	1,547
Butter	..	..	..	Cases	..	3,084	3,039
Potatoes	..	..	..	Bags	..	531	646
Milk	..	..	..	Cans	..	820	820
Fruit	..	..	..	Cases	..	50	50
Mutton	..	..	..	Carcases	..	464	466
Pigs	..	..	..	"	..	121	121
Sundries	..	..	..	Packages	..	520	587

Ice sold for the period 583 tons, and ice supplied to other Divisions of Agriculture $13\frac{1}{2}$ tons.

It should be added that the closing down of the Cold Stores was effected on the 10th May, 1913, and on the 26th of that month the buildings, plant, equipment, tools, and stores, etc., were handed over by the writer to the Public Works Department in thoroughly good order and condition.

On the 1st April, 1913, Mr. Robertson, the 1st Engineer, was transferred to the Mines Department, and on the 26th May the writer was transferred to the Grootfontein School of Agriculture. The services of Mr. Wood, the 2nd Engineer, and Mr. Harrod, the Clerk and Storeman, were terminated on the 31st May, 1913.

JNO. WINTER.

STATEMENT OF RECEIPTS AND EXPENDITURE.
GOVERNMENT COLD STORES, PIETERMARITZBURG, FINANCIAL YEAR, 1912-13.

RECEIPTS.		EXPENDITURE.	
	£ s. d.		£ s. d.
Sales of Ice and Storage ..	2,095 19 4	Administrative Charges.	
Less amounts outstanding ..	131 2 6	Salaries ..	1,111 19 1
Free issues of Ice to other Govt. Depts. ..		Maintenance and Running Expenses.	
		Labour and Rations ..	443 12 2
		Fuel, Water and Light ..	406 10 9
		Upkeep of Machinery, etc. ..	334 19 4
		General Stores and Sundries ..	251 14 11
Total Revenue ..	1,111 19 1		2,436 17 2
Actual Expenditure charged under Vote VI., S.1 ..	2,436 17 2	Total Expenditure ..	3,548 16 3
		Actual Revenue paid to Exchequer ..	1,964 16 10
		Free Issues to other Depts. ..	20 11 3
			£5,534 4 4

F. B. SMITH,
Secretary for Agriculture.

PROFIT AND LOSS ACCOUNT.
[COLD STORES, MARITZBURG, FINANCIAL YEAR, 1912-13.]

	£ s. d.		£ s. d.
To Salaries and Allowances ..	1,111 19 1	By Revenue accrued for period ..	1,532 3 8
To Maintenance and Running Expenses.		„ Free Issues of Ice to Govt. Dept. ..	20 11 3
Labour and Rations ..	443 12 2	„ Balance being loss for period ..	1,552 14 11
Fuel, Water and Light ..	1,406 10 9		2,893 7 2
Upkeep of Machinery, etc. ..	334 19 4		
General Stores and Sundries ..	251 14 11		
	2,436 17 2		
Depreciation ..	425 4 4		
Interest on Capital at 4 % ..	472 1 6		
	897 5 10		
	£4,446 2 1		£4,446 2 1

F. B. SMITH,
Secretary for Agriculture.

APPENDIX VI.

THE DIVISION OF BOTANY.

UNION OF SOUTH AFRICA.

Department of Agriculture,

Pretoria, 25th March, 1913.

The Secretary for Agriculture.

ANNUAL REPORT, 1912-13.

I have the honour to submit the following report on the work of the Division of Botany for the 15 months ending the 31st instant.

The work of the Division has been greatly restricted owing to the transfer of part of its duties to the Schools of Agriculture, and the administration of the Noxious Weeds Acts first to the Head Office staff and subsequently to the Administrators of the several Provinces; and further to the reduction of my staff to a point below the minimum essential to the economical and effective working of the Division. I am informed that it is intended to finally abolish the Division, and this is confirmed by the fact that the only assistant left of my staff is under notice of transfer to another Division, all but one of my clerical staff have been transferred to other Divisions, while I, myself, have been notified that my services in the Department will cease as soon as the College of Agriculture at Pretoria is established. It has been suggested that arrangements might be made for me to join the Staff of that College, but a definite enquiry elicited the official information that no promise could be made. Such a state of unsettlement and uncertainty must obviously militate against securing the best results from any staff, however loyal and efficient, and I sincerely trust that it may be brought to a finality as speedily as possible.

The efforts of the Division have been concentrated on the following lines:—Maize breeding; Lamziekte investigation; the study of the veld and the breeding and propagation of Winter pasture grasses; the identification of Noxious weeds, Native pasture and other Economic plants and forest trees, and the redrafting of a Noxious Weed Bill suitable for application throughout the Union.

MAIZE BREEDING.

Prior to the period under review much of our work was necessarily of a preparatory nature, such as might properly be classed as "spade work." It was necessary to apply the principles of plant-breeding as enunciated in other parts of the world, to the local problems affecting the maize crop in South Africa. It was soon found that there was but little reliable information obtainable, on which to work, and it was therefore necessary to begin *de novo* and study the plant in the field under all sorts of conditions. I was criticised somewhat severely for spending so much time in travelling about the country on this work, but had I not done so it would not have been possible to have gained that intimacy with prevailing conditions which is essential to success in this work, and at the same time I was able to get in touch with a very large body of maize growers throughout the country, whose assistance has been invaluable ever since. In the same way, I may add, that visits to Agricultural Shows, especially those in the maize sections of the country, have proved of incalculable benefit by enabling me to meet more farmers to discuss their conditions, and to see in a short space of time what they were producing. This also afforded an opportunity to give them lessons in the selection of their seed, which are beginning to show a marked result in the improvement of their exhibits.

A good deal of experiment work had to be performed before we were really in a position to advance in the direction of definite improvement of the maize crop.

[U.G. 47—'13.]

During the year under review, however, I am glad to be able to record that owing to the extensive and thorough manner in which this preliminary work was carried out, we have been able to make much greater strides towards definite improvement.

This improvement is being carried out on a number of separate lines, among the most important of which may be mentioned (1) the earlier maturing of Hickory King to allow of its more extensive cultivation on the High-veld. (2) The improvement in quality of the grain of some of the early maturing breeds. (3) The development of more drought-resisting types suitable for the large stretches of country in the Western Transvaal and adjacent portions of the Southern Bechuana-land region, where maize growing is at present somewhat precarious, and (4) the development of new types which will meet the special requirements of a certain class of trade.

Definite progress has been made along all these lines. But it would be an unnecessary waste of space and time to go into details at the present stage. It would suffice to say that I have succeeded in establishing definite breeds of the following:—

- (a) An earlier maturing Hickory King;
- (b) An improved-grain type of early maize;
- (c) Some drought-resistant types for the western country, and
- (d) A more promising type which will, I think, bear favourable comparison with the high-priced Bessarabian and other South-eastern European types.

But it would be a great mistake to conclude that this work is nearly finished. The types are there, but they have to be fixed. This fixing process is essentially one demanding time, and requires at least 3 to 5 seasons. And when the type is fixed it is necessary to propagate it, and this should be done on a scale which will enable us to distribute it among farmers in sufficient quantity to avoid any chance of favouritism, and also to avoid the criticism levelled at the Department in connection with its pedigree stock which are sold by auction to the highest bidder.

After careful consideration, the only satisfactory solution of the position appears to me to be the establishment of a large seed-maize breeding station, where not less than 3,000 acres can be under crop. I have been reluctantly compelled to the conclusion that this is work which falls outside of a Government Department, inasmuch as the regulations and restrictions to the successful administration of the public service are such that they necessarily interfere seriously with the effective working of such a concern. In the United States this work has successfully and apparently with entire satisfaction been taken up by private concerns, and some of them, such as the firm of Funk Brothers, Bloomington, Illinois, have maize farms of 24,000 acres in extent.

BOTANICAL EXPERIMENT STATION.

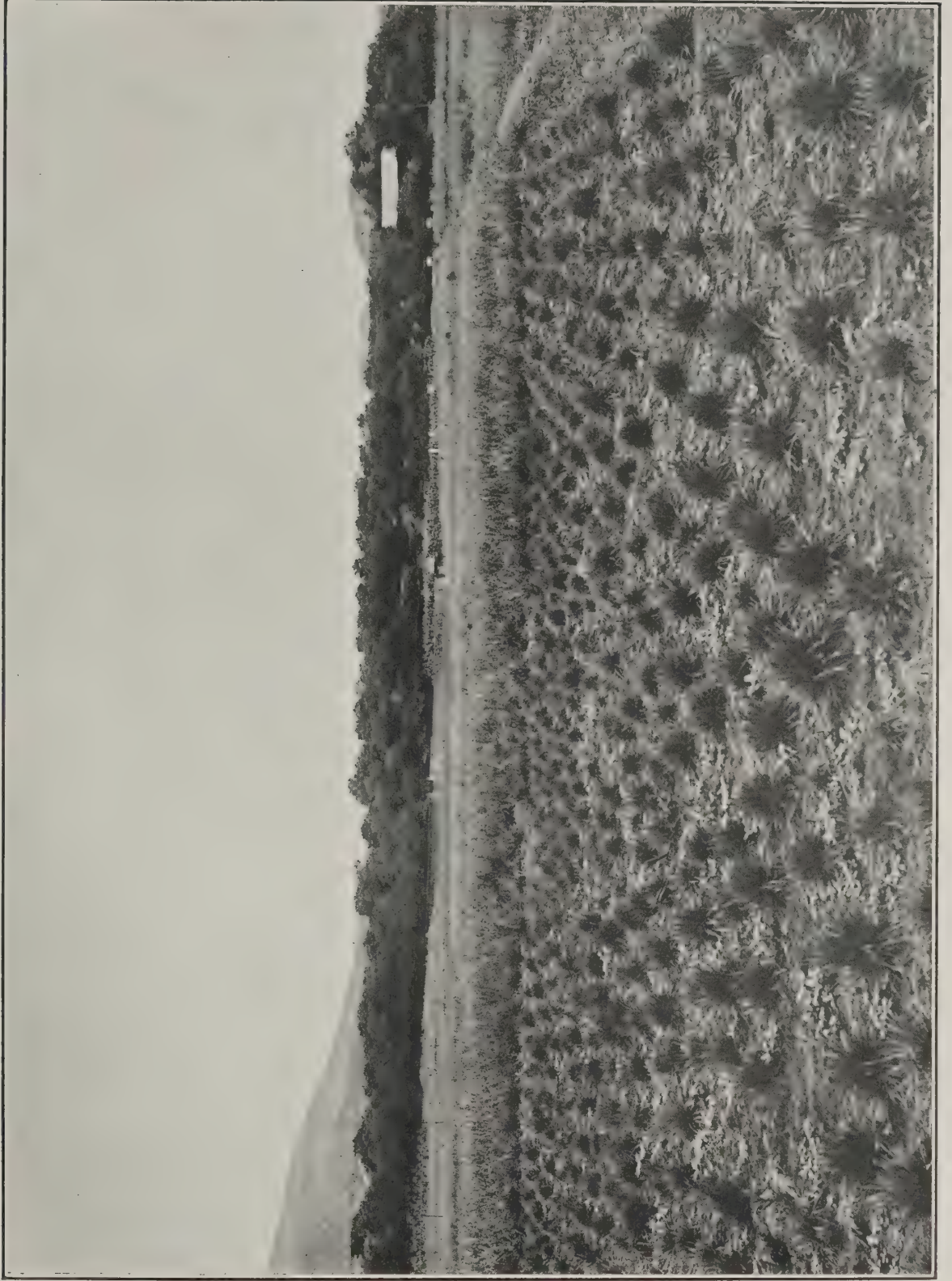
It was not until August that the new house at Groenkloof, built by the Municipality of Pretoria, in exchange for the improvements at Skinner's Court, was available for occupancy. Although the water-supply, sanitary arrangements, and out-buildings were not completed till the end of March, Mr. Goodwin moved in in August, in order not to lose another season's work.

Our earliest-planted maize germinated with the first good rains in October, and died off for lack of moisture. In some cases a small percentage of the plants survived; these have been carefully saved as being apparently more drought-resisting than the balance.

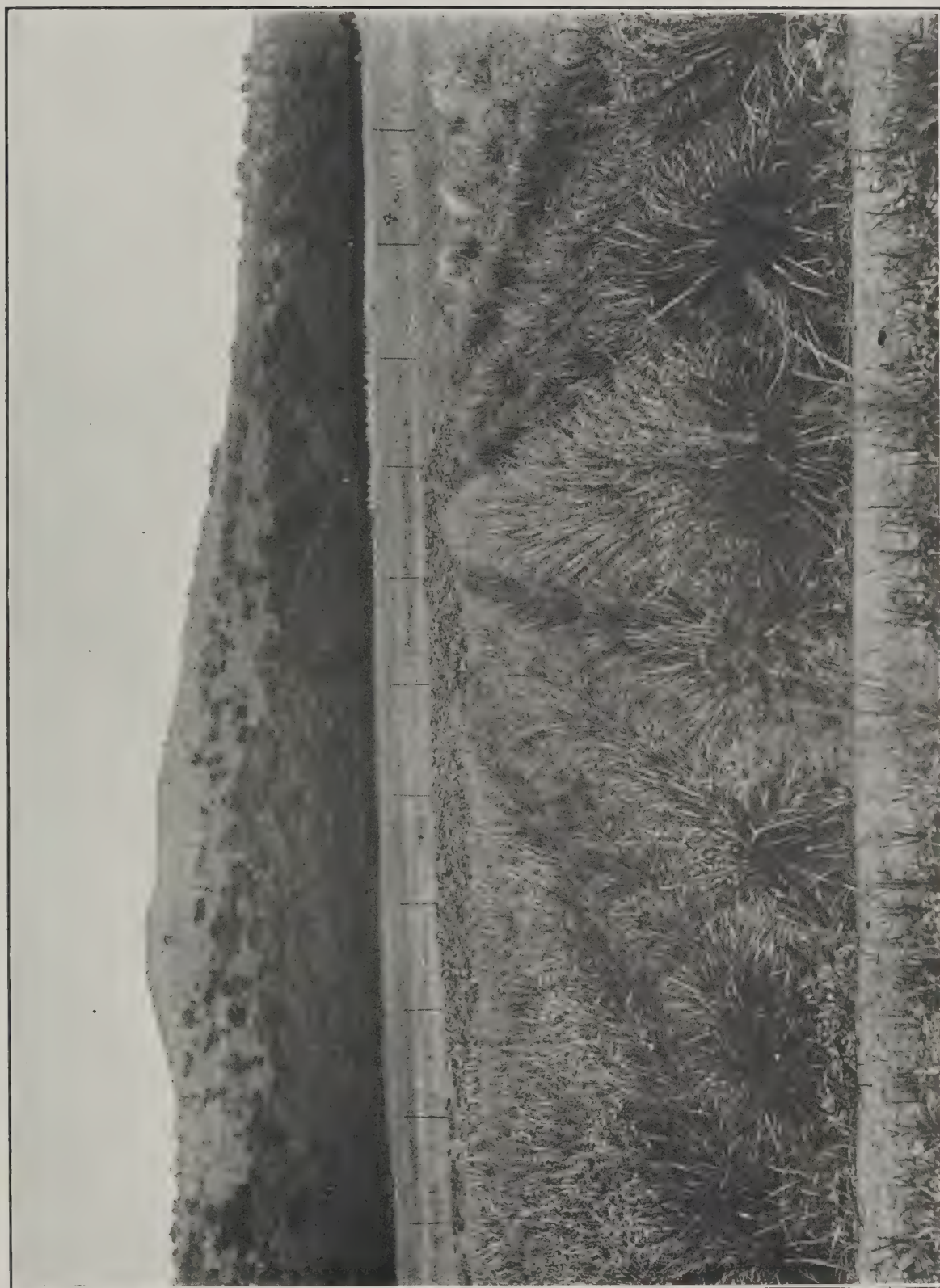
I was informed by a friend that several farmers who were travelling to Pretoria by rail, criticised these stands on account of their straggling appearance, and one of them subsequently offered me the friendly criticism that I should have been well advised to cut off and replant the thin stands, "because the Government should only have the best." I explained the position, which he then admitted was sound, but he added that 99 per cent. of the farmers who saw the plots would not understand. It is well, therefore, to put on record the following facts:—

(1) That the Station is an *Experiment Station* and not a *Demonstration* or *Model Farm*.

(2) Many experiments are conducted: they cannot all be equally successful, or they would not be experiments. The visiting farmers often learns more from seeing the negative results (or so-called "failures") than from the obvious successes; if we eliminate the failures, farmers will obtain false impressions, and will not be able to learn by contrast.



SLENDER WHEAT-GRASS AND NEW ZEALAND TALL FESCUE AT BOTANICAL EXPERIMENT STATION, GROENKLOOF.



SELECTING IMPROVED STRAINS OF NEW ZEALAND TALL FESCUE AT BOTANICAL EXPERIMENT STATION, GROENKLOOF, 1912.

(3) We are testing numbers of newly introduced breeds of maize; these almost invariably give a poor stand the first year, and however often they might be re-planted we should have the same result. To cut them out would mean that we should never get such breeds acclimatised.

(4) I have purposely thinned out a number of stands in order to save only the desirable plants. This method of selection is much more effective, and saves time as compared with leaving all the plants till harvest. It also minimises injury by drought, of those that remain.

(5) In several cases where early planting was practised, the stand was relatively poor, owing to the fact that a large percentage of young plants could not stand the drought. Some remained in each case, however, and these were preserved as being Nature's own selection of drought-resisting strains. In several such cases I could not replant because that was all the seed of a particular breed (sometimes a valuable new cross).

In this connection it may be interesting to note that on February 17th, I harvested dead ripe ears of a new breed which had been planted on November 27th, the total time from planting to harvest being 82 days, or one week less than three months.

In spite of the unfavourable season, we have grown some excellent stands of maize at Groenkloof, and the crops, both this season and last, have been much superior to those ever produced at Skinner's Court. Both the situation and the soil at Groenkloof are far superior for my work, to these of Skinner's Court. Moreover, we are now only half the distance from town, which means a great saving of time to me and to visitors. The proximity to the railway is also a great advantage, for travellers see the plots and comment on the Station. I do not know of any place near Pretoria so eminently suited for the purpose of a small Botanical Experiment Station.

The ground was in a filthy state when we took it over, and the labour and expense of cleaning have been heavy. Great credit is due to the late Mr. Goodwin for the excellent manner in which he got the place into shape, in addition to the large amount of experimental work he carried out.

Owing to the necessity for such a heavy expenditure of time and labour to get the place into shape, to the large number of maize experiments conducted, and to the moving of permanent crops from Skinner's Court, we could not undertake much additional work excepting the propagation of winter pasture grasses. This latter work has been conducted on a much larger scale than was practicable at Skinner's Court, and will be one of the prominent features of the Groenkloof Station.

The best grasses being grown are:—

New Zealand Tall Fescue (*Festuca arundinacea*).

Phalaris bulbosa.

Paspalum dilatatum.

Paspalum virgatum.

Blue grama (*Bouteloua oligostachya*).

Side-oats grama (*Bouteloua curtipendula*).

Kikuyu grass (not yet identified).

Warm Baths grass (probably *Melinis minutiflora*).

Rhodes-grass (*Chloris gayana*).

Australian Blue-grass (*Andropogon sericeus*).

American Buffalo-grass (*Buchloe dactyloides*).

Slender wheat-grass (*Agropyron tenerum*).

Tall oat-grass (*Arrhenatherum elatius*).

Mitchell grass (*Astrebula triticoides*).

The sheep have proved most useful for testing the several grasses. They show a predilection for Sweet-potato tops, Kikuyu-grass and Warm-baths grass, but also feed readily on Blue grama, Slender wheat-grass, Tall oat-grass, Rhodes-grass and New Zealand Tall fescue.

Soybeans.—Several varieties and strains have been tested, with very varying results, but at the time of writing the crops have not been harvested, so that I am unable to give results. All the varieties suffered from drought, which has materially affected the height of the plants. Some strains and breeds are evidently much more drought-resistant than others.

Maple Peas (*Pisum arvense*) and Vetches (*Vicia sativa* and *Vicia villosa*) were grown on dry lands as winter crops for green-manuring, and gave very satisfactory results. The growth of *Vicia villosa* was too slow during the winter, and it did

not cover the ground sufficiently well before it became desirable to plough it in. But there seems no reason why *Vicia sativa* and the Maple Pea should not be grown satisfactorily for winter green-manure crops.

MAIZE EXPERIMENTS.

It is impossible to record the results of the experiments, at the date of writing, as the crops are not yet harvested. I should like to record, however, that these experiments have been more satisfactory in every way than any carried out at the old Botanical Experiment Station at Skinner's Court.

LAMZIEKTE INVESTIGATIONS.

The major part of the first nine months of the year 1912, was almost wholly occupied with a botanical investigation of the disease called Gal-Lamziekte. As it was necessary to bring the information gained, to the attention of Parliament at as early a date as possible, I brought together as much data as I could collect on the subject, and embodied it in my Annual Report for 1911, although much of it was information collected in 1912.

In August, 1912, Dr. Theiler and I planned a series of experiments to be carried out by his staff at the several Lamziekte Stations during the season 1912-13, and which would take 12 months to complete. These were started, and were well under way at the time of writing. Unfortunately, however, we have had the most unfavourable season possible for an investigation of this nature, and as a result we have been obliged to "mark time."

Our theory that the disease is due to the genesis of a toxine in the grass or other herbage under certain peculiar conditions, in which drought is one of the factors, has been severely criticised in view of the fact that the season under review has been one of the driest on record. But our critics cannot have read carefully or understandingly, the evidence brought forward by us, nor can they have followed out carefully our train of reasoning. Had they done so they would have noted (as pointed out by us) that drought alone is not the essential nor the sole factor, but that we believe it is a certain condition of certain herbage which becomes toxic under certain—at present incompletely defined—conditions, of which drought at certain temperatures, and in certain kinds and conditions of soil, is one of the factors.

In the absence of Dr. Theiler in Europe, and as one who has been most closely associated with him in this investigation, I feel that it is my duty to answer the criticisms which have been levelled at him for leaving South Africa at this time, when the disease is still rampant. In consultation together on this very question, we were agreed that now was the best possible time to get away; certain experiments had been planned which it would take at least 12 months to complete, and until they had been carried out, our path of investigation was completely blocked, except for such pieces of work as I could do here, and as Dr. Theiler could do in consultation with specialists in other lines, in Europe. It was highly desirable that before these experiments were completed, Dr. Theiler should get away for study and a complete change, in order to be in a better position to work out the results of these experiments on his return.

As far as my own side of the Lamziekte investigation is concerned, I have been unable to do much since the winter of 1912, owing to the extremely unfavourable season, which has made it impossible to fill up the gaps in the census of the plants of the Lamziekte Regions. I have worked out the essential features of the flora of the Southern Bechuanaland Region, and most of the plants typical of the region have been identified. I have outlined a method of presentation of the list of plants collected, which is being filled in by Miss Stent.

I shall, doubtless, be submitted to the same criticism as Dr. Theiler, for going on leave at the present juncture, but the same reasons apply in my case also; I can do nothing here to further the investigation, till after the coming winter.

I might add here, to avoid the necessity for further reference to the subject, that my absence at the present time is due to the necessity for carrying out some important investigations into the transmittal of inherited characters in maize, with the assistance of men like Mr. Bateson, Professor Biffen, and Professor Punnett, who are leaders in this line of research. I am also taking the opportunity to visit the leading maize markets of London and Liverpool, to find out whether we cannot secure better prices for our product by growing a somewhat different type of maize. I hope also to be able to visit the United States to look into several problems con-

nected with the breeding and growing of maize in the Home of the Maize Industry.

I might have done more work on Lamziekte during the latter part of the summer which has just passed, had not my Assistant, Mr. Walters, been retrenched, making it necessary for me to do his work instead of giving my whole time to Lamziekte. I wish to place on record that this retrenchment has most seriously interfered with the working of my Division, and has seriously hindered my investigation of Gal-Lamziekte.

SEASON.

The season has been a peculiar one; the normal Spring rains were delayed till long past the usual period, which delayed planting. When planting was carried out on Autumn-ploughed lands, the October rains only sufficed to germinate the seed without providing moisture enough for the young plants, which soon died off. In some cases re-planting was done twice, which threw the crop back. If killing frosts fall early this year, the loss of crop will probably be heavy, owing to the late planting of the stands.

Another curious feature of the season has been the rapidity of growth of crops (as well as weeds), when once well started; at Vereeniging there are stands of maize planted as late as December 26, which show every sign of giving a good crop, whereas in other years maize planted a week earlier has been a complete failure. I am inclined to attribute the difference to the greater frequency and amount of sunshine between rains, in the months of January and February, as compared with some seasons, for maize is eminently a sunshine-loving plant.

Men who have ploughed deeply and taken care to conserve their soil-moisture, have again come out far ahead of those who have merely followed the old method.

STAFF.

Miss M. Holder was appointed Junior Herbarium Assistant (temporary), in February, 1912, for the special purpose of releasing Miss Stent from the routine and mechanical work, in order that the latter might devote practically all of her time to the flora of the Lamziekte Regions. As the financial condition of my own vote could not stand this addition, it was arranged that it should be paid for out of the additional sum voted for Lamziekte investigations.

My Assistant for Field Experiments, Mr. Walters, was retrenched early in the year, and transferred to the Rhodesian Service. He had proved himself a most able, tactful, and energetic Assistant, entirely loyal—a virtue far too rare in the Service to-day—and of increasing usefulness to the Department and the country, as he gained in knowledge of local conditions and the agricultural requirements of the country. He was tactful, and got on well with the farmers.

It is with the deepest regret that I have to record the death from Enteric Fever on March 3rd, at the age of 27, of Mr. Geoffrey J. Goodwin, Manager of the Botanical Experiments Station. Mr. Goodwin possessed a delightful personality. He was very thorough and conscientious in his work, and was a good farmer, knowing how and when to get his lands into shape to produce the best results; he also possessed the experimental sense to a marked degree, a rare combination which rendered him eminently well-fitted for the post he occupied, and which would undoubtedly have led to a larger and still more responsible post in the future. He got on well with his natives, and got good work out of them, contrary to the theory that only the man born in the country knows how to handle native labour. It is a pleasure to record the loyal service rendered by one whose place it will be difficult to fill.

PUBLICATIONS.

During the 15 months under review I have continued to contribute to the *Agricultural Journal* as pressure of other work permitted, and the following notes and articles were published.

1912.

In *Union Agricultural Journal*, 1912:—

Vol. III., No. 1, 1912:—

215. Plant Poisons, I, pp. 88-92.

Vol. III., No. 2, February, 1912:—

216. Plant Poisons, II., pp. 219-223.

217. The Jointed Cactus, with Plate; pp. 224-226.

218. Correspondence: American Buffalo grass; Time to Sow Tall Fescue grass, p. 288.

[U.G. 47—'13.]

Vol. III., No. 4, April, 1912:—

219. Plant Poisons, III., pp. 535-536.

Vol. III., No. 5, May, 1912:—

220. An Early Maturing Hickory King, pp. 676-677.

221. Maize Exhibits at the Johannesburg Show, with 2 Plates, pp. 682-698.

Vol. IV.

222. Preliminary Report on Investigations into Gal-lamziekte, four papers in the *Union Agricultural Journal*, Nos. 1, 2, 3, and 5. Also (with emendations) in Rep. of Dir. of Veterinary Research.

Vol. IV., No. 1, July, 1912:—

223. Maize Notes (2 plates, 3 figures), pp. 88-98. And Reprint.

224. Correspondence: A Bee-plant—*Melobolium candicans*, p. 137.

Vol. IV., No. 2, August, 1912:—

225. Maize Notes, II., pp. 206-319, with 3 plates, and Reprint.

226. Correspondence: Is the *Syringa* poisonous? p. 319.

Vol. IV., No. 4, October, 1912:—

227. Notes from the Botanical Experiment Station, with plate, pp. 608-613.

Vol. IV., No. 5, November, 1912:—

228. Notes from the Botanical Experiment Station, II., 2 plates, pp. 608-613.

229. Maize Notes, III., 1 plate, pp. 740-744.

Correspondence: Maize breeding; Tumbleweed ("Tolbosje") pp. 767-769.

Vol. IV., No. 6, December, 1912:—

231. The Preservation and Use of Maize for Stock-feed, pp. 843-853.

232. Botanical Notes, XI., 1 plate, pp. 884-887.

233. Correspondence: Phalaris; The European Vetch, pp. 934-935.

234. Maize Notes, IV., 2 plates, pp. 866-870.

In *Annals Transvaal Museum*, May, 1912:—

235. A First Check-list of the Flowering-plants and Ferns of the Transvaal and Swaziland (assisted by Mrs. Pott-Leendertz), pp. 119-182.

In *Transactions of the Royal Society of South Africa*, Vol. II., Pt. 3, 1912:—

236. Observation on the Inheritance of Characters in *Zea Mays*.

237. Notes on the Genus *Ficus* (Tourn.) Linn., Op. cit., Pt. 4.

In *South African Journal of Science*:—

238. The Poisonous Properties of *Mesembrianthemum Mahoni* N.E.B.

239. Additions and Corrections to the Recorded Flora of the Transvaal and Swaziland, July 1, 1911, to June 30, 1912.

1913.

In *Union Agricultural Journal*, 1913:—

Vol. V., No. 1, January, 1913:—

240. The Preservation and Use of Maize for Stock-feed, II.

241. Winter Pasture Grasses.

Vol. V., No. 2, February, 1913:—

242. The Preservation and Use of Maize for Stock-feed, III.

243. Chicory Culture. Reprint as Bulletin.

245. Teff (*Eragrostis abyssinica*).

Vol. V., No. 1, January, 1913:—

244. Teff (*Eragrostis abyssinica*).

In Kew Bulletin, No.

I have the honour to be, Sir,

Your obedient servant,

JOSEPH BURTT-DAVY,

Government Agrostologist and Botanist.

APPENDIX A.

REPORT ON THE ECONOMIC HERBARIUM.

BY MISS S. M. STENT, HERBARIUM ASSISTANT.

During the period from January 1st, 1912, to March 31st, 1913, we have received into the Herbarium 4,800 specimens, making an average of 320 specimens a month, the biggest average we have had since the Herbarium was started. Of these 2,816 were collected by Mr. Burt-Davy, almost all in connection with the lamziekte investigations, and the remaining 1,984 were from correspondents and collectors, and a very large percentage of these were also in connection with the Lamziekte investigations.

Though a number of specimens—from the lack of sufficient or complete material—still remain unidentified, the great majority have been named and filed into the Herbarium for future reference.

In February, 1912, Miss Holder was appointed as temporary junior assistant to help in the registering and filing, etc., of Lamziekte specimens, also to relieve me of the general Herbarium work so that I could devote my time entirely to determinations. Miss Holder has matriculated, and is now studying for her Intermediate; she is quickly becoming proficient in her work, and is gradually bringing more order into the Herbarium, and so rendering it more useful for reference. Where before our specimens were confined almost entirely to the Transvaal flora we now have representatives of the Flora of the Cape Province, Natal, and O.F.S., and we have had to add six new herbarium cupboards.

A catalogue of all the plants collected in the Lamziekte regions has been prepared by Miss Holder first as a simple list, and then in card form arranged under the families.

During the five months from May to September Miss Tennant was absent on leave, and most of the typing for the Division was done by Miss Holder.

I prepared an exhibit for the Agricultural Shows this year consisting of 63 samples of noxious weeds, poisonous plants, native and introduced weeds and pastures and hay grasses, etc., all mounted, labelled with full information, and framed.

PLANTS OF ECONOMIC INTEREST.

Brachypodium flexum Nees., from the Steward, Trappist Mission, Waschbank, Natal (H. 7093) with the following information. "Natives call it 'in Kinga,' the grass is in round bushes, and has—as natives say—a deadly effect on cattle if eaten by them. Natives immunize cattle by giving them doses made from the ashes of this grass (procured after burning), mixed with a native drink 'in thwala' or 'imfinci.'"

We have had no previous information of this kind about this grass; the material was not sufficient for a feeding test.

Melasma orobanchoides Engl., from S. H. Boyle, Newington, Komatie Poort. "Specimen of the parasite which has attacked the Soy beans grown here as an experiment. Only about 30 plants have been attacked, and I can find no trace of the parasite on any of the leguminous wild plants, or on the ground nuts, Kafir beans or any other cultivated legumes. The land was for two years under cotton, and previously carried a crop of ground nuts. . . . So far the parasite appears to have done little damage to the host plants; in the smaller example there appear to be even root-nitro-nodules, though in most instances these are absent. . . . It is possible, of course, that if the parasite becomes more established it may do considerable damage."

Phytolacca decandra Linn. "Poke Berry," from A. W. Higgins, Aliwal North. (H. 7239), sent as suspected of being poisonous. This plant is used in the U.S.A. medicinally as a purgative emetic, and somewhat as a narcotic; the berries and roots contain the active principle in a greater degree than the rest of the plant, and are highly poisonous. The berries yield a red fluid which, however, has never been fixed for use as a dye.

Anoiganthus breviflorus, Baker. From H. Blaikie, Inchgarth, Himeville. (H. 8284), who says:—

"It is peculiar this tulip flowering this time of the year (April). It generally flowers during the early part of the summer, and is one of the plants about which I am suspicious as killing cattle. The land in which I found the flowers is a drained swamp which I am ploughing up."

[U.G. 47—'13.]

Also from Mr. Knight, Newcastle, Natal, who says, "Known as the 'tulip,' and said to be fatal to cattle eating same. . . . It seems purely a water plant growing and confining itself to the edge of pools." (H. 7883).

A quantity of this plant was submitted to the Acting Director of Veterinary Research, Pietermaritzburg, for a feeding test, and he reported as follows:—

"The test as far as it went was entirely negative. . . . considerable difficulty was experienced in obtaining a regular supply of the plant, hence the intervals in feeding, and the comparative smallness of the feeds; these circumstances mitigate somewhat the value of the test, as larger quantities might induce poisonous symptoms, but the above result is sufficient to show that the plant does not possess the extremely poisonous properties suggested by one correspondent."

This plant is a yellow-flowered Amaryllidaceae, and is not that generally known as "Tulip." The flowers are yellow, with a longish tube, and are borne each with its own stalk three or four together on the end of the flower stalk. They are sweet scented.

Carduus pycnocephalus Linn., collected by the Burweed Inspector in some of the Town lands, Pretoria (H. 8441). This is a new introduction into the Transvaal, probably from Europe. It is a thistle with rather small oval flowering heads, with purple flowers, the whole plant being very spiny. It is very necessary to have more material in order to be certain of the identification.

Euphorbia (Tirucalli) Linn., sent by Capt. Madge, Potgietersrust, Waterberg, where it is known as "Mutlalamela." There has been some doubt as to the identity of this rubber tree, and we have not been able to procure flowering specimens.

It appears, however, from the material we have to be the *Euphorbia Tirucalli*, which is being worked for rubber in Natal.

Cyperus esculentus Linn., from J. T. Harrison, Roodepoort and other correspondents. This is commonly known as "uientjes." It is one of the sedges, and an extremely troublesome weed requiring much time and patience in its eradication, as this is best accomplished by constant cultivation and not allowing a single green shoot to develop, as only by means of the green shoots can the plant continue to support itself.

Cissus cactiformis Gilg and *Excoecaria africana* Muell, from Mr. R. A. Taylor, Zululand (H. 8749).

"I send a sample of creeper 'Ahlonhlwana' (*Cissus cactiformis*), and of a tree 'Intansboti' (*Excoecaria africana*). The extract from these, say 4-1 is an excellent specific for some diseases in cattle. It is a strong purgative. . . . It seems to be a liver medicine, and is used in liver diseases. I boil them and use the tea-coloured extract. Some crush them in water only."

The tree, *Excoecaria*, belongs to the Euphorbia family; it contains a drug known as Excoecarin, which is acrid and poisonous if taken in sufficient quantity. The *Cissus* belongs to the Grape family, but we have no information as to its properties.

Heeria salicina (Sond.) Engl, from Mr. J. E. Pippin, Ross Senekal (H. 8775), who says he gets rubber and resin from the tree.

This tree belongs to the same family as the "Karree-boom"; the rather narrow leaves are pale green above, and white beneath, and the berries are black when ripe.

Cynodon incompletus Nees, from Mr. Arthur Dixon, Millholm, Paulpietersberg, Natal. "We cook this for some time; it gives off a reddish juice which is very good for the blood and indigestion, and is much used by some of the Dutch people."

This is the fine "Quick-grass" nearly allied to the "Bermuda" and "Florida" grass.

Panicum stagnium Koen, from Mr. S. L. Kling, Johannesburg, who says it is growing in his waterlands, and that he has not seen it before. This grass was reported in the Transvaal many years ago, but it seems to have become much more prevalent during the last two years. It is related to *Panicum crus-galli*, the farm-yard grass, and is probably a good pasture grass, but we have no reliable information about it.

Acanthospermum sp. From Mr. W. Ladds, Munster, Vierfontein (H. 8783). A new burweed that is proving troublesome to wool growers. We have not yet been able to identify it exactly, but it seems to be a species of *Acanthospermum*, probably introduced from South America.

It spreads along the ground and sends down roots from the nodes of the branches, and is increasing rapidly, and likely to become a bad pest if not eradicated in time. It has also been reported from Piet Retief in the Transvaal.

Cadaba juncea (Linn) B. and H. and *Ipomoea crassipes* Hook, from Mr. Charles Maggs, Springbok Flats (H. 8752 and 8753). Mr. Maggs says these plants flourish on red soils where no cultivated crops do well, and cattle eat them. The plants have been submitted to the Government Chemist for analysis; if it is satisfactory as regards feeding value Mr. Maggs proposes to cultivate the plants on a large scale.

Lotononis trichopoda Benth, from Mr. Charteris Hooper, Miekwood Downs, Knysna. The plant grows in great quantities, and is said to be excellent food for ostriches. A quantity was submitted to the Government Chemist for analysis, who reported as follows:—

ORIGINAL MATERIAL.

Moisture	29.50	per cent
Ash	10.90	„
Protein	6.42	„
Fat (Petroleum ether extract)	1.12	„
Crude Fibre	17.00	„
Carbohydrates (by difference)	35.06	„

DRY MATTER.

Ash	15.45	per cent.
Protein	9.10	„
Fat	1.59	„
Fibre	24.04	„
Carbohydrates	49.82	„

ASH INCLUDES.

Sands and silica	1.78	per cent.
Lime	6.61	„
Magnesia	.65	„
Sulphuric acid	.15	„
Phosphoric acid	.30	„

“Remainder of Ash chiefly Carbonic acid combined with the lime.

“The sample included a large proportion of very tough woody stems. The thicker portions of these stems bearing no leaves were cut off and rejected. The portion rejected amounted to about 25 percent. by weight of the total sample.”

BOTANICAL EXPERIMENT STATION, GROENKLOOF. STATEMENT RE.

Farm or Station.	No. of Draught Animals on Farm.	Other Live Stock.	Average No. Labourers Employed.	Total No. of Acres.	Total No. of Acres Cultivated.	No. of Experimental Plots laid out.
Botanical Experiment Station, Groenkloof.	8 Mules 6 Oxen	21 Sheep	7	..	30	630

APPENDIX VII.

THE ROOIBLOEM INVESTIGATION.

The Secretary for Agriculture.

I have the honour to present the following report on the Rooibloem investigation which has been carried out during the 12 months following the date of my last report. I propose to give only a general account of the investigation during that period as a more comprehensive and detailed statement is included in the manuscript forwarded herewith for publication as a departmental bulletin.

Throughout the winter months of 1912 a detailed investigation of the germination of the rooibloem seed and of the manner in which the first infection of the mealie is made, was carried out in this laboratory. The main facts of this phase of the life history of the parasite were established and close attention was paid to the conditions which are necessary for successful germination. Since the first infection comes always from the seed, it was hoped that a study of the conditions of germination could be prevented or the young seedling killed before infection took place.

As a result of many experiments evidence was obtained that the following conditions retard or inhibit germination and infection, viz.:—

- (1) The presence of much water in the soil.
- (2) The presence in the soil of certain soluble salts possessing high isotonic coefficients, as for example, sodium chloride and Potassium and Sodium nitrates.
- (3) The presence of substances which give an alkaline reaction to the soil water.

Conditions Nos. 2 and 3 suggested methods suitable for testing under agricultural conditions. By the courtesy of Mr. A. E. Tidboald (Springbok Flats), Mr. C. Weir (Koedoespoort, Pretoria), and Mr. C. H. Mitchell (Bushy Vales, Natal), experimental plots, each of an area of approximately five acres, were laid down in the summer of 1912 on their respective farms. I am indebted to these gentlemen not only for the use of their land, but also for the not inconsiderable labour which the treatment of the plots necessitated.

As the Laboratory results gave little indication of the quantities of the various reagents that should be applied under field conditions, these preliminary field trials were made with amounts which experience in America and elsewhere has shown to be beneficial to the mealie. The substances used to obtain the second condition named above were Sodium Chloride and Sodium Nitrate, separately and in combination. In other plots an attempt was made to give an alkaline reaction to the soil-water by the use of Calcium Cyanamide.

The experiments were considerably interfered with by the early drought which in all cases involved late sowing and a slow growth of the mealie in its seedling stage—conditions unfavourable to the successful action of the substances employed. On the "Bushy Vales" plot they were further complicated by a phenomenal rain which fell soon after the planting of the mealies.

On all three plots there were distinct indications that the application of the nitrate produced a favourable result. The results in the case of Sodium Chloride were less marked; calcium cyanamide seemed to be without any effect at all. It is believed that the quantities of the nitrate and the sodium chloride were insufficient, and it is proposed to try the effects of larger amounts in the coming season. The apparently complete failure of the calcium cyanamide is not understood, and is under further investigation. With regard to the nitrate, there is every reason to believe that it can be supplied in sufficient quantity to produce a satisfactory result. Whether this result can be obtained at a cost which is not prohibitive is not yet known. Methods founded upon other principles, and which may perhaps be equally effective and at the same time less costly, are now being studied.

In the meantime, attention should be drawn to the rapid spread of the pest, which is due primarily to the fact that mealies are continually planted in badly infected land, and the crops of rooibloem which results allowed to set seed. The seeds are so easily carried during the winter by the wind that a very large area of mealie lands is quickly infected from a comparatively small patch which contains an abundance of seed. Leguminous crops—in fact any crops not belonging to the grass family—are at present practically immune from attack, and, if planted on land known to be badly infected, will at least stay the spread of the parasite to lands which are at present clean.

The grant made by Government in the 1911-12 session in aid of this investigation has been expended in (1) the payment of the salary of an assistant to aid in the carrying out of the laboratory experiments; (2) the purchase of the substances used in the field experiments; (3) the payment of my own travelling and subsistence expenses in visits to Springbok Flats and Pretoria.

(Sgd.) H. H. W. PEARSON.

Botanical Laboratory,
South African College,
9th July, 1913.

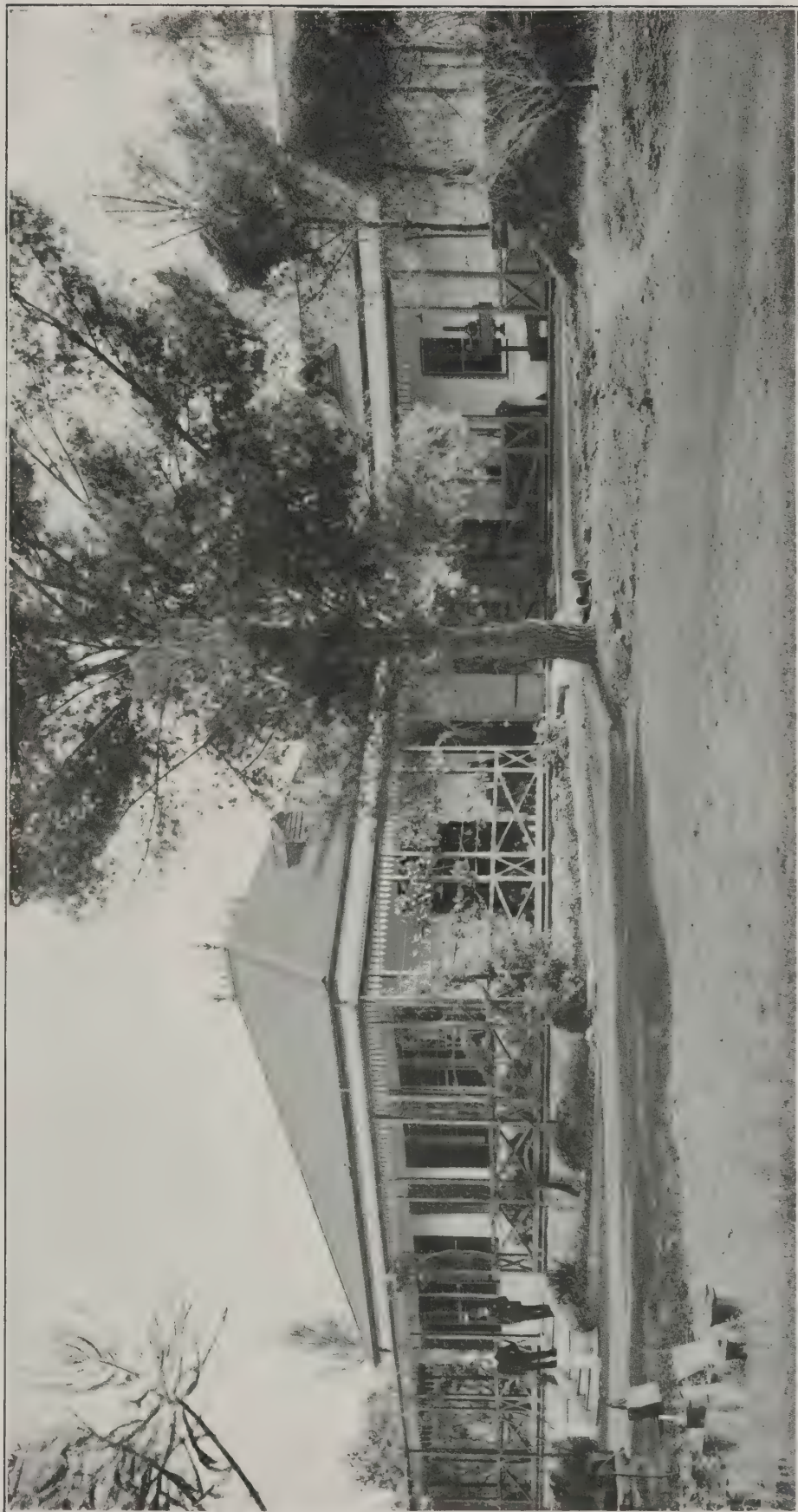


FIGURE 1.
LABORATORY FOR PLANT PATHOLOGY AND MYCOLOGY. PRETORIA.



FIGURE 2.
NATAL HERBARIUM, DURBAN.



FIGURE 3.
NATAL HERBARIUM, DURBAN

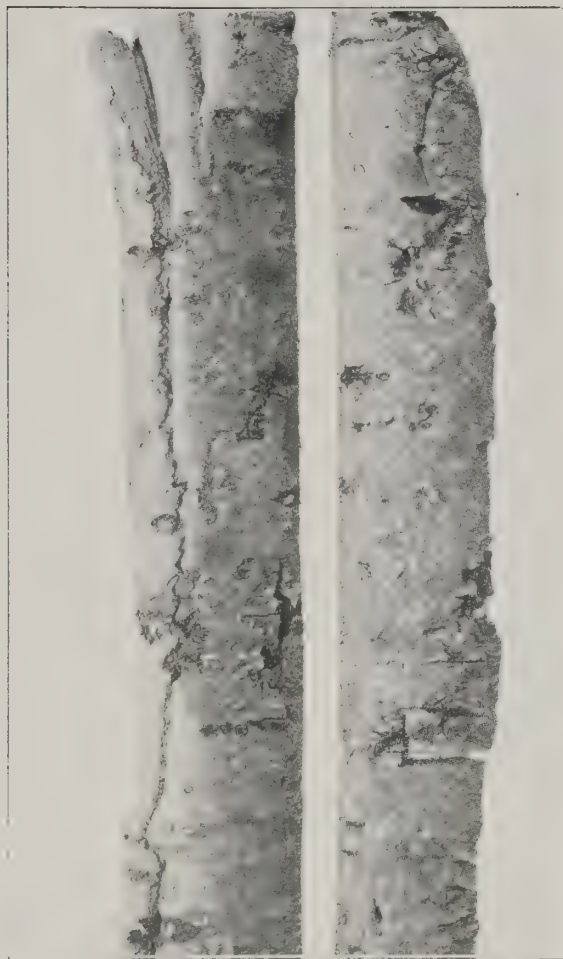


FIGURE 4.
APPLE TREE CANKER DUE TO *Sphaeropsis malorum*, PECK.

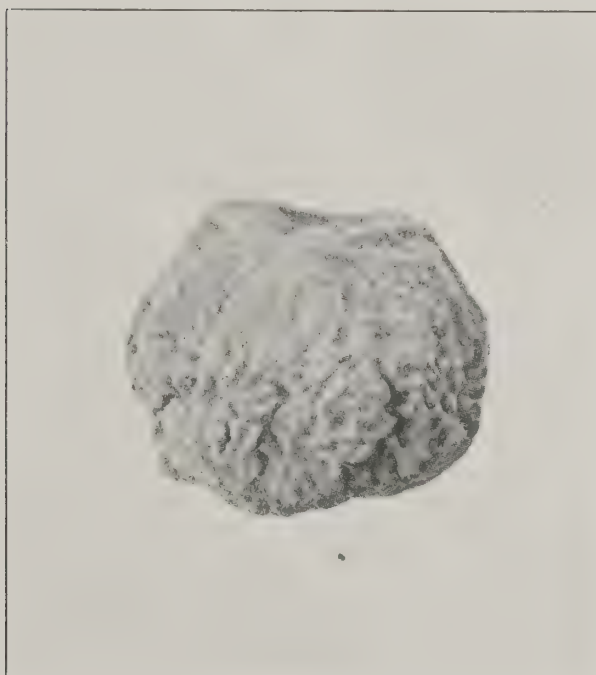


FIGURE 5.
QUINCE FRUIT MUMMIFIED BY *Sphaeropsis malorum*, PECK.

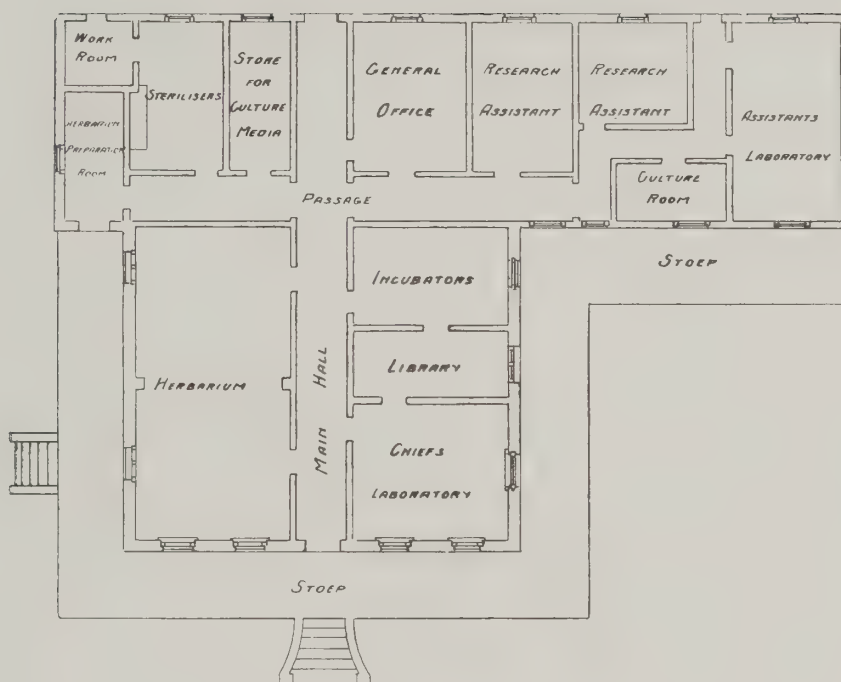


FIGURE 6.
GROUND PLAN OF PHYTOPATHOLOGICAL LABORATORY,
DEPARTMENT OF AGRICULTURE, PRETORIA.



FIGURE 7.
MAIZE MOULD DUE TO *Diplodia Maydis* SACC.

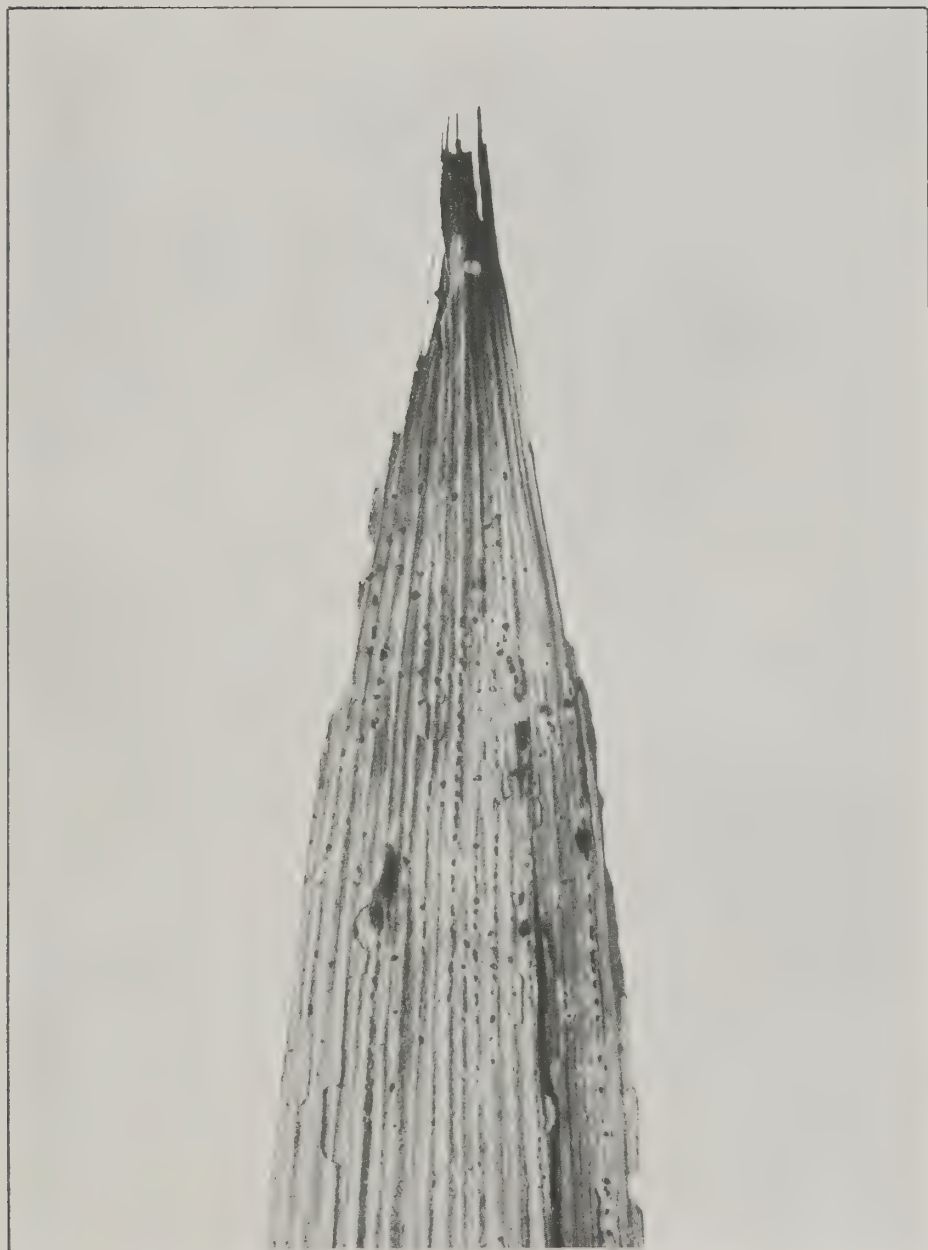


FIGURE 8.
PUSTULES OF *Diplodia Maydis* SACC. ON MAIZE GLUME.

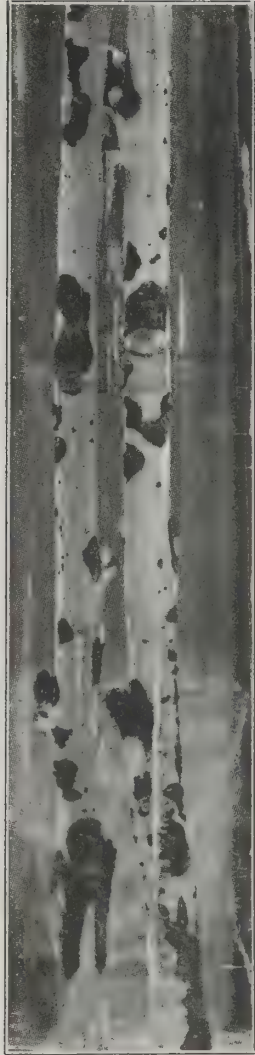


FIGURE 9.

PEACH TWIGS AFFECTED WITH *Cladosporium carpophilum* THUM.

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FIGURE 10.
BON CHRETIEN PEAR, SHOWING ROT DUE TO *Cladosporium* SP.

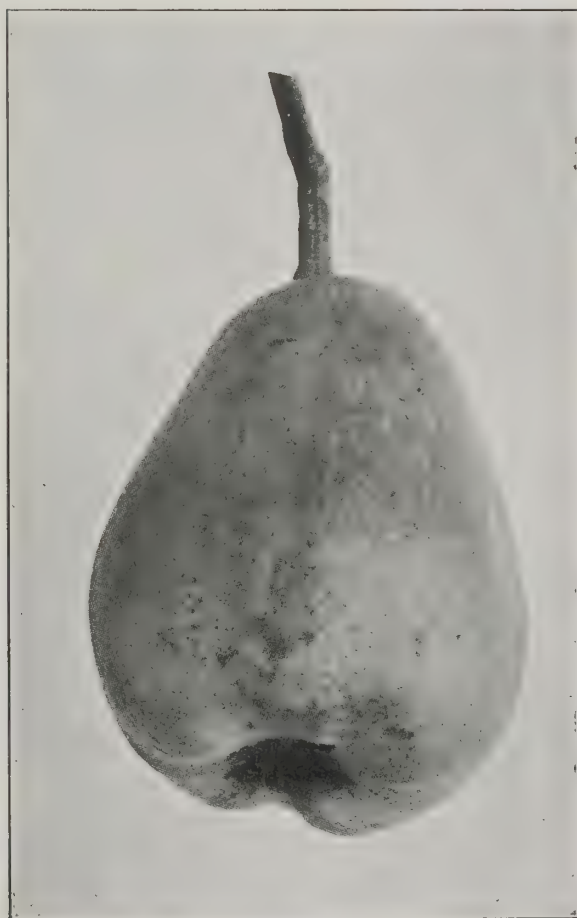


FIGURE 11.
BON CHRETIEN PEAR, SHOWING FIRST STAGES OF ROT DUE TO *Cladosporium*
WHICH STARTS ROUND THE CALYX.



FIGURE 12.

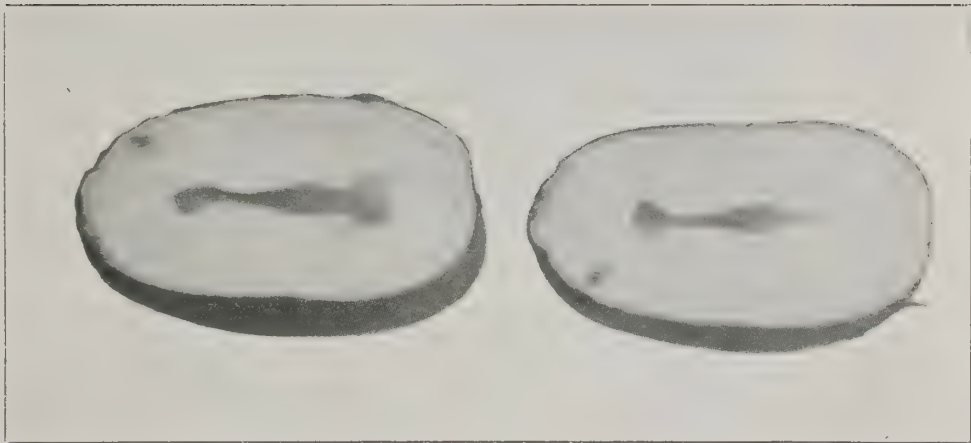


FIGURE 13.

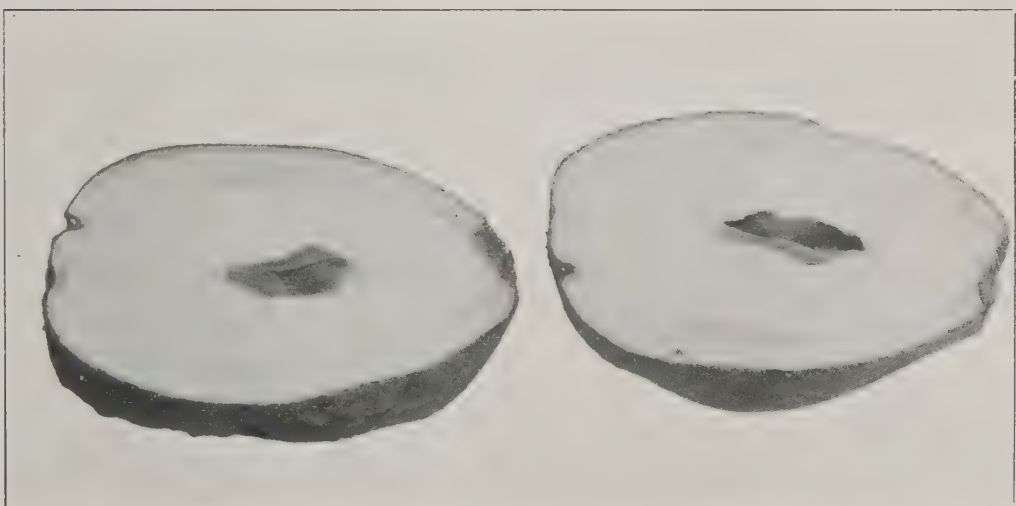


FIGURE 14.

IMPORTED "SEED" POTATOES, SHOWING ROT DUE TO *Bacillus phytophtherus*, APPEL.

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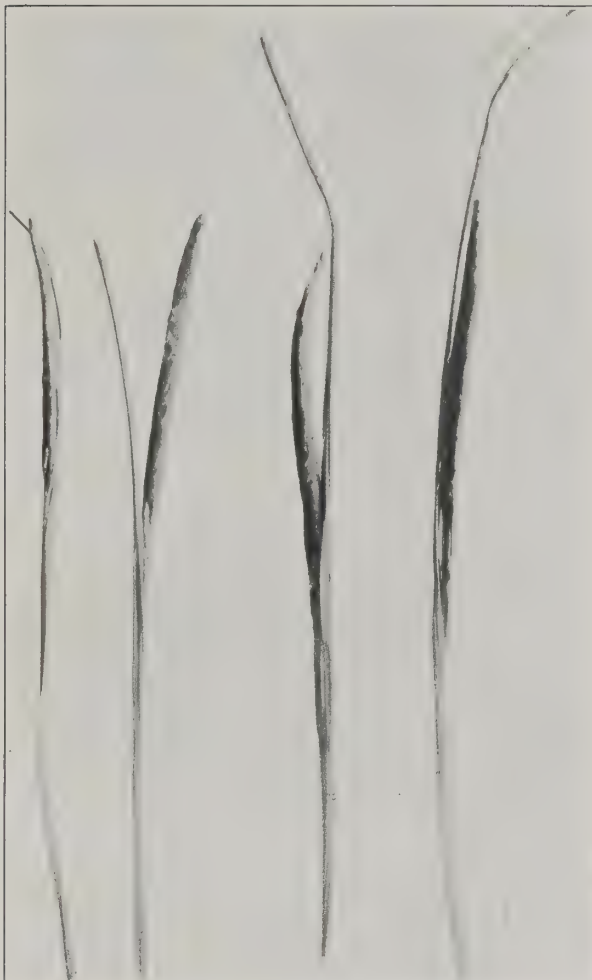


FIGURE 15.
REED-MACE FUNGUS, *Epichloe* SP. ON *Eragrostis plana*.



FIGURE 16.

MOTTLING OF WATTLE BARK. THE BRIGHT GREEN STEM SHOWS BLACK, DEPRESSED BLOTCHES.
SPECIMEN IS THE STEM OF A FOUR-YEAR-OLD TREE.



FIGURE 17.

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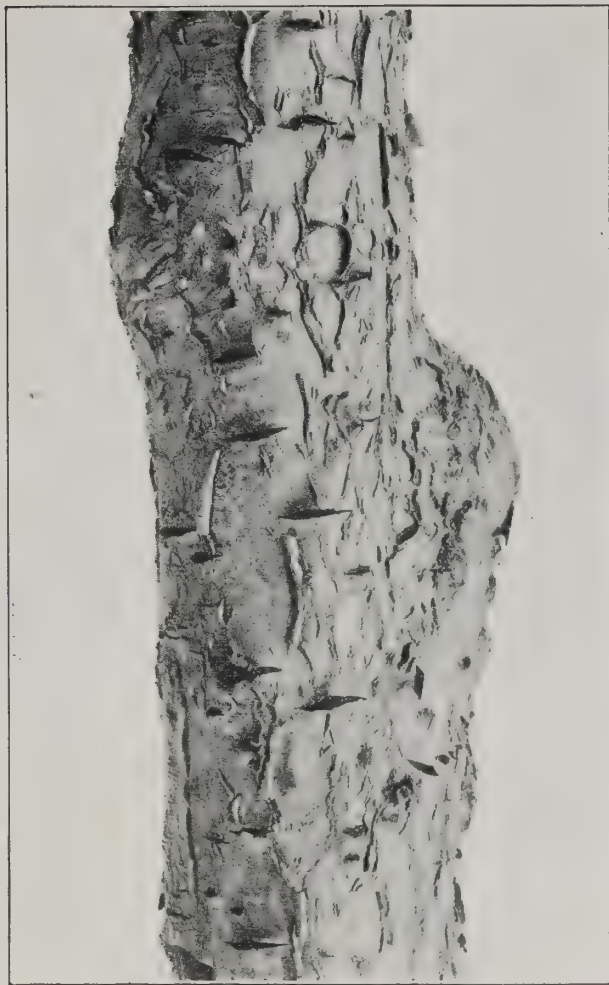


FIGURE 18.

APRICOT BRANCH SHOWING TRANSVERSE SPLITTING OF BARK DUE TO *Calosphaeria princeps* TUL.

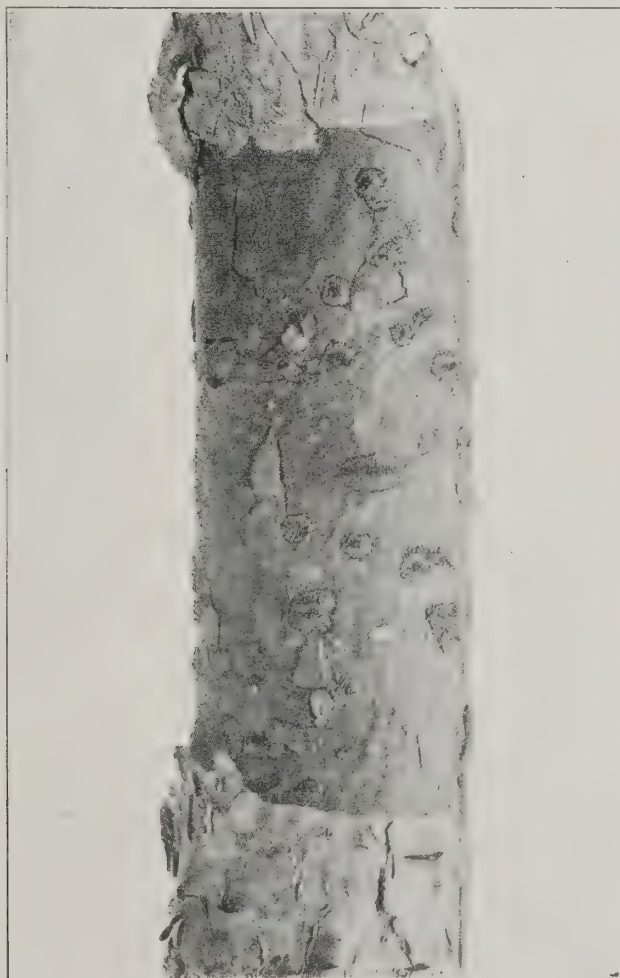


FIGURE 19.

APRICOT BRANCH WITH PORTION OF BARK REMOVED, AND SHOWING PERITHECIA OF *Calosphaeria princeps* TUL.

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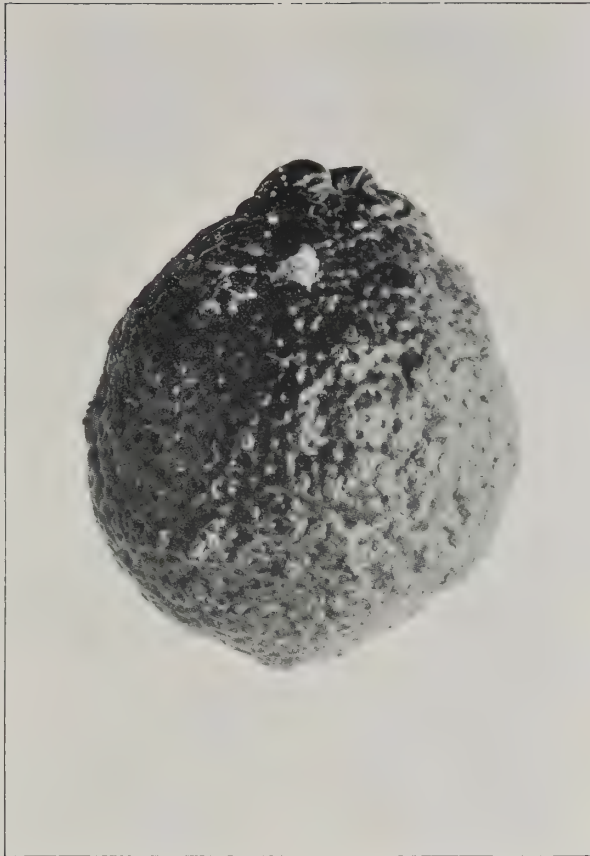


FIGURE 20.
LEMON SCAB DUE TO *Cladosporium Citri* Maas.



FIGURE 21.
LEMON SCAB, DUE TO *Cladosporium Citri* MASS.

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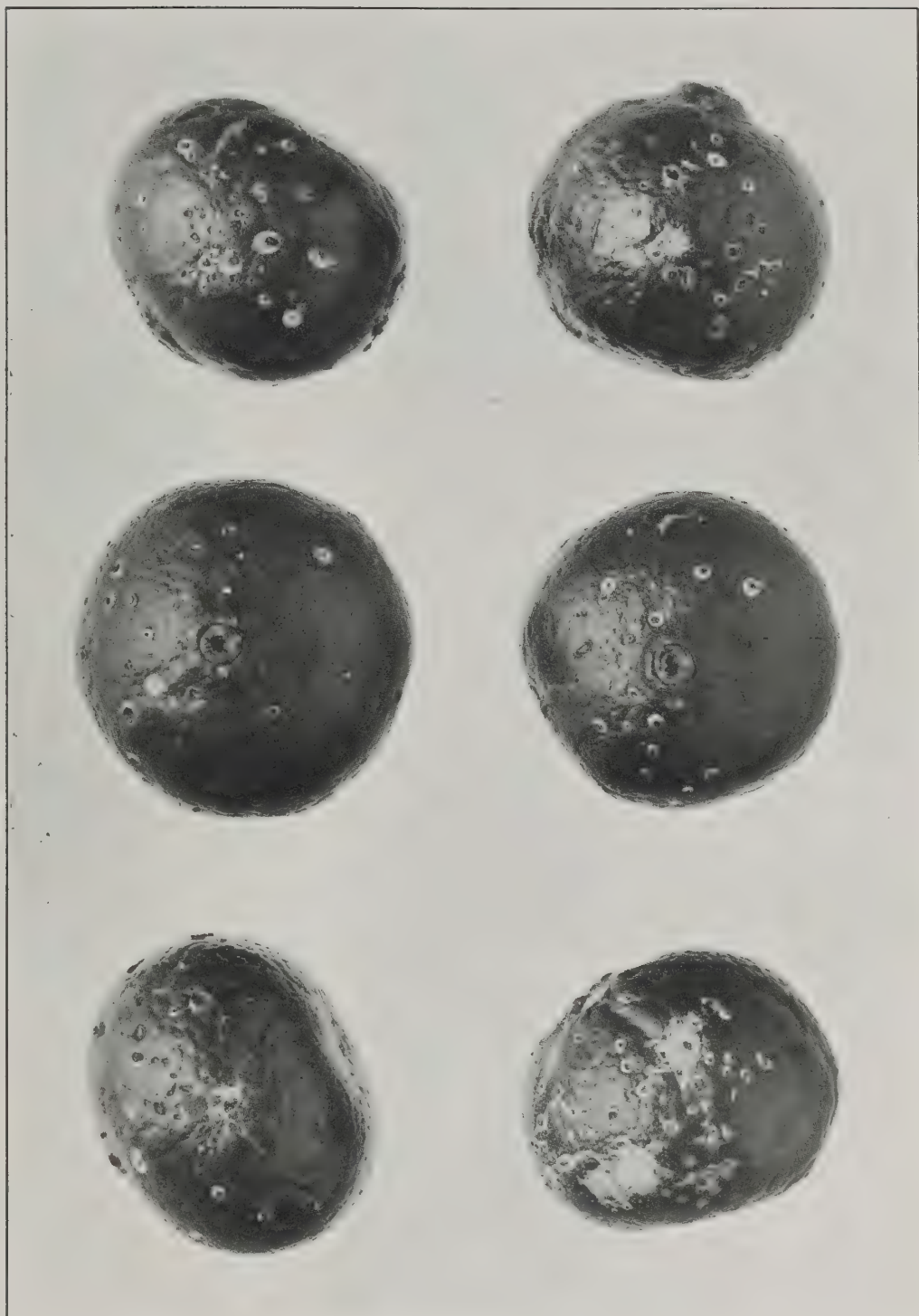


FIGURE 22.
NAARTJE FRUIT SCAB, DUE TO *Sporodermium* SP.

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COLUMBIA

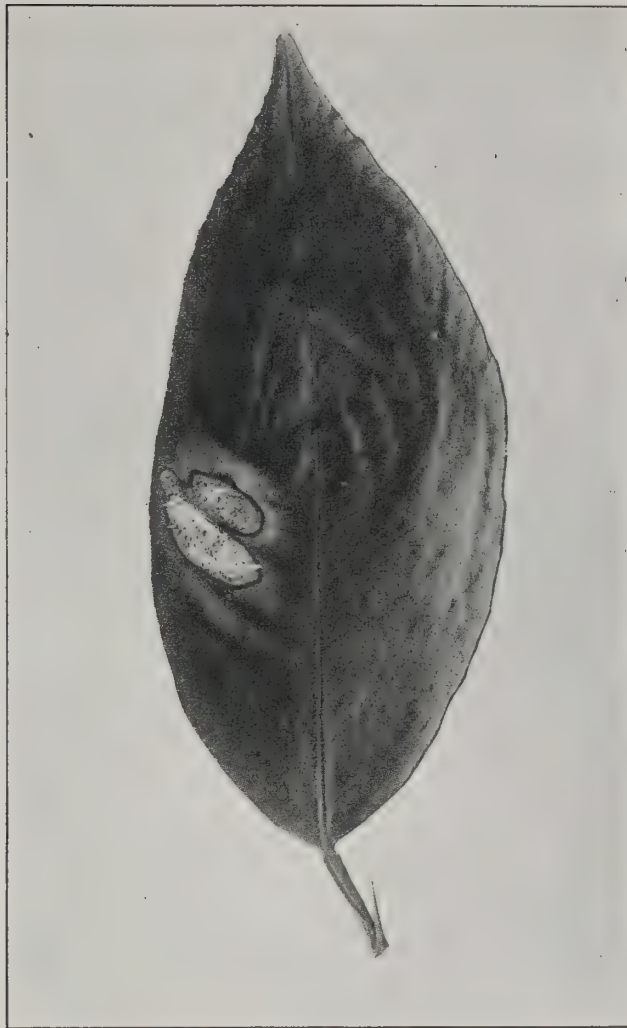


FIGURE 23.
ORANGE LEAF BLOTCH, DUE TO *Pleospora disrupta* McALP.

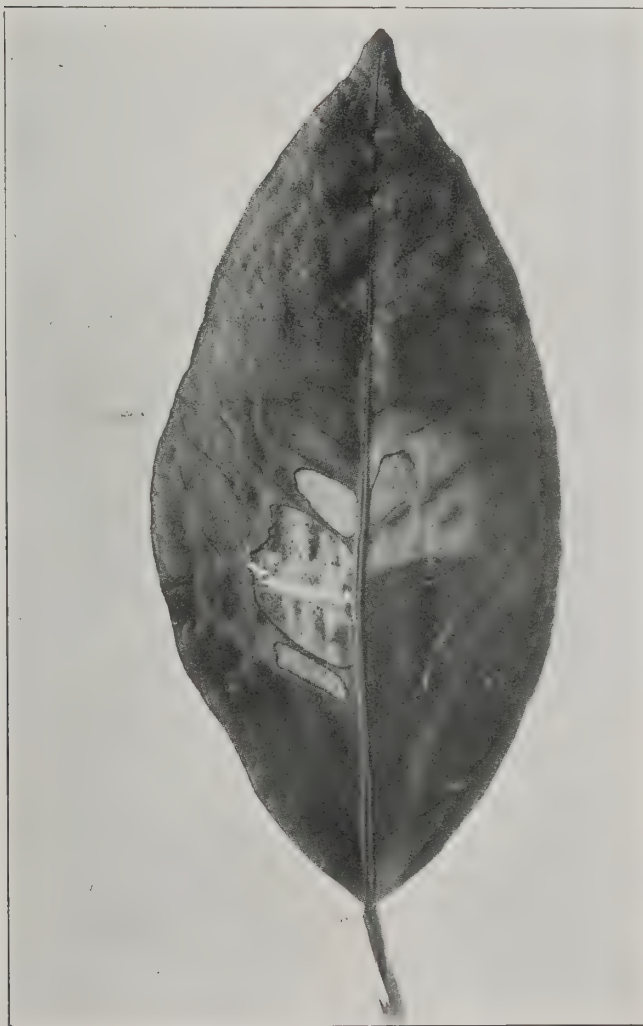


FIGURE 24.
ORANGE LEAF BLOTCH, DUE TO *Pleospora disrupta* McALP.

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FIGURE 25.
PEACH MOLD DUE TO *Fusarium putaminum* THUERM.

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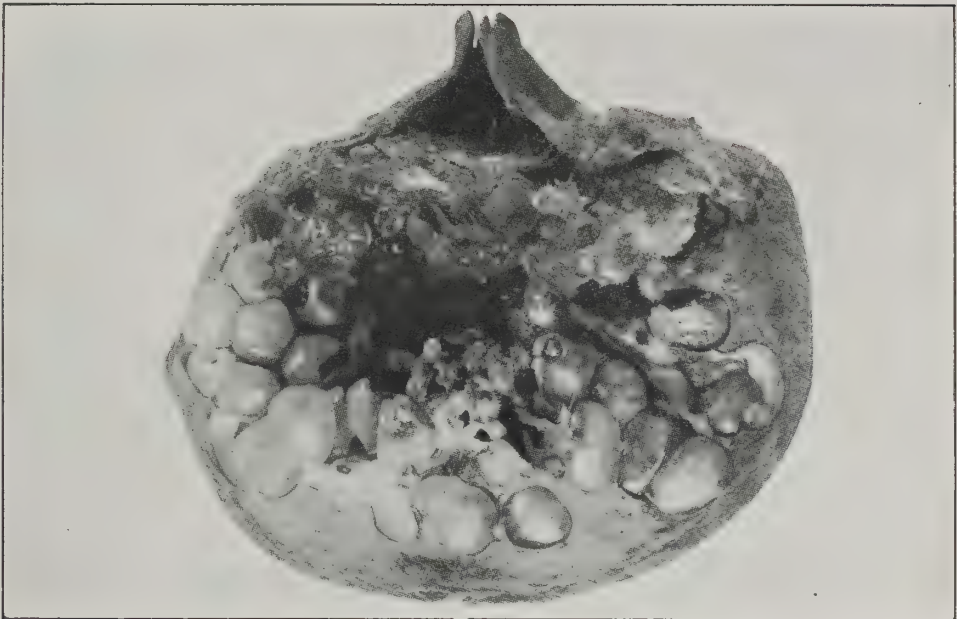


FIGURE 26.
POMEGRANIATE ROT, CAUSED BY *Sterigmatocystis* SP.

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FIGURE 29.
GROWTH OF BAGWORM FUNGUS FROM MEDIA IN LINEN BAG.

APPENDIX VIII.

UNION DEPARTMENT OF AGRICULTURE.

DIVISION OF PLANT PATHOLOGY & MYCOLOGY.

ANNUAL REPORT: 1912-13.

Although the period under review has been one of exceptional drought, fungus diseases of plants and plant pathological troubles were numerous. The unusual severity of the drought is shown by the fact that well established trees from ten to 15 years standing, such as Scotch Firs and *Cupressus macrocarpa* have died off through sheer lack of moisture in the soil.

One of the most encouraging features of the year's work under review is the increasing interest which the farming community in general is displaying in the care and attention of their crops and fruits to matters of plant hygiene. Farmers are beginning to realise that it is just as important to treat their seed or spray their crops as it is to pay attention to the more up-to-date methods of tilling and fertilizing the soil. Almost daily enquiries are received as to the best sprays that should be employed for the various crops, while expensive and elaborate spraying outfits are being bought by many progressive farmers.

The programme of work that was laid down for the year, has been followed out in so far as we were able with the laboratory facilities at our disposal. Considerable progress has been made with the fungus flora of South Africa, the fungus disease of Bagworms in Natal, and the behaviour of the Mango fruit spot bacterium to various germicides. Considerable work of an investigational nature has also been carried out on problems which could not be foreseen when my last report was written, for instance, the problem of preventing the growths of moulds in the mines on the Rand where spraying experiments for allaying the dust in connection with the prevention of Miners' Phthisis or Silicosis were in process; the gumming of wattles, a cheese and a butter disease, were matters of some urgency.

One of the most noteworthy events of the year under review is the fact that the Division has recently been housed in better quarters, and has been provided with spacious grounds suitable for field observations on cereal and other crops. At present, greenhouse accommodation is lacking, but plans for these buildings which are essential for the investigation of most of our obscure problems have already been drawn up and submitted to you.

The Division has also taken over the control of the Colonial Herbarium at Durban, and has acquired sufficient ground surrounding it for conducting experiments on tropical and sub-tropical crops.

The personnel of the scientific staff of the Division has remained unchanged, but provision has been made on this year's estimates for an additional research assistant.

DESCRIPTION OF LABORATORY FOR PLANT PATHOLOGY AND MYCOLOGY.

On the 26th of January last, Government decided to remove our laboratory from the Old Volksstem Buildings in Pretorius Street to the house "Vrede" at 590 Vermeulen Street, Arcadia, situated on the South Western slope of Meintjes Kop and in close proximity to the Union Buildings. [Fig. 1].

The Division moved into the new laboratory in the middle of March, and it is in every respect a huge improvement on what we originally had.

The laboratory is well situated and is surrounded by about $8\frac{1}{2}$ acres of ground suitable for experimental purposes, and should fulfil our requirements most admirably. It will be necessary to build up-to-date greenhouses and experiment houses, and when this is done the place can easily be made a model Institution for Plant Pathology, and we shall at last be able to undertake the investigation of some of the more important problems on a proper footing. Detailed plans for the construction of these greenhouses have already been worked out and submitted to you.

The new laboratory as is shown in the accompanying plan [Fig. 6] consists of a well built brick building; it is situated at a height of 4,403 feet above the sea level. The front of the laboratory faces south, and the main entrances are from this and the north side.

The front of the building is occupied by the Chief's Private Room and the Herbarium. The Herbarium, a beautiful oblong room on the west side, measuring 37 feet 4 inches by 18 feet 4 inches, is well lighted on two sides. Attached to it is a small work-room for the Herbarium Assistant measuring 14 ft. 6 in. by 6 ft. 10 in.

The Chief's Private Room, which measures 18 ft. 4 in. by 16 ft. 1 in., is lighted on two sides, from the east and south. Adjoining and leading into it is a small Library 18 ft. 4 in. by 7 ft. 9 in. Next to the Library, and situated

In November last the late Hon. J. W. Sauer, then Minister for Agriculture, 4 in. by 11 ft. 8 in., and containing 15 incubators.

The Assistant's Private Room is situated at the extremity of the East Wing, and is well lighted on three sides, while a laboratory bench runs round. It measures 23 ft. 11 in. by 13 ft. Adjoining it, is a small room facing South, measuring 12 ft. 3 in. by 6 ft. 5 in., which is used as an incubator in the cultivation of organisms on the large scale.

Facing North are two rooms 18 ft. 1 in. by 13 ft. 6 in. and 13 by 12 ft. 3 in. respectively. These are fitted up as research rooms, the smaller one of which can also be used as a dark room.

Also facing North is the General Office for the Clerical Staff, measuring 18 ft. 1 in. by 13 ft. 6 in.

The sterilizing room and general laboratory is situated in the North-West corner, and measures 18 ft. 1 in. by 11 ft. 4 in. A small washing-up room 8 ft. 4 in. by 7 ft. 7 in. is attached.

Next to the sterilizing room and facing north is a room 18 ft. 1 in. by 7 ft., which is provided with a cellar and which is used for the storage of culture media, etc.

Spacious passages 6 ft. wide run through the laboratory, and the walls are suitably hung with pictures and diagrams illustrating various plant diseases.

All the incubators, sterilizers, autoclaves, paraffin baths and other necessary appliances are heated by electricity. The only naked flames being used in the laboratory are spirit lamps for the purpose of sterilizing platinum needles, etc.

NATAL HERBARIUM, DURBAN.

In November last the late Hon. J. W. Sauer, then Minister for Agriculture, decided to accept the Durban Botanic Society's proposal that the Colonial Herbarium, the Director's house, and a suitable area of surrounding land be transferred to Government. It was further decided that in addition to maintaining the Herbarium in Durban, its scope should be enlarged, so that it might also be used as a research station for the investigation of diseases of tropical and sub-tropical crops. No more suitable or appropriate place for a phyto-pathological station in Natal could be obtained than this, for the Herbarium contains all the type specimens of Medley Wood's Natal Fungi, which are bound to prove of great assistance and interest to anyone engaged on mycological research.

The Herbarium and its adjuncts were taken over from the first day of the current financial year and placed under the administration of this Division.

The building, which is of solid brick consists of the following rooms:—

- (1) Herbarium, 52 ft. by 25 ft.
- (2) Director's Office, 19½ ft. by 12 ft.
- (3) Library, 22½ ft. by 12 ft.
- (4) Museum, 22½ ft. by 12 ft.
- (5) Work Room, 19 ft. by 12 ft.

The building is so constructed that a second storey can be added when required. [Figs. 2-3].

The Herbarium has been specially designed so that the specimens are quite free from damp, and contains over 45,000 mounted and classified specimens stored in 54 Cabinets.

Dr. Medley Wood's report on the Herbarium for the past year is appended hereto.

DISEASES PREVALENT IN 1912-13.

The most conspicuous diseases of the year were:—

Apples.—Bitter Pit. Bitter Rot due to *Glomerella rufomaculans* (Berk.), Spauld & Van Schrenk. Canker caused by *Sphaeropsis malorum*, Pk. Crown Gall due to *Bacterium tumefaciens*, E. F. Smith.

Arabian Lucerne.—Dying off due to sun-scorch.

Maize.—Cob Mould due to *Diplodia Maydis*, Sacc. Leaf Scorch due to *Helminthosporium turcicum*, Pass. Smut due to *Sorosporium Reilianum* (Kuehn), McAlp.

Peach.—Fruit Spot or Black Spot due to *Cladosporium carpophilum*, Theum. Silver Leaf Disease.

Pear.—Fruit end rot due to *Cladosporium* sp.

Pinus sp.—Due to *Diplodia pinea*, Kickx.

Potato.—Bacteriosis due to *Bacillus solanacearum*, Smith. Blight due to *Phytophthora infestans*, De Bary. Leaf Curl due to *Macrosporium solani*, Cke.

Rose.—Mildew due to *Sphaerotheca pannosa*, Lev.

Veld grass.—*Eragrostis plana* and *Sporobolus indica*. Reed-mace fungus due to *Epichloe* sp.

Wattle.—Gumming trouble due to unfavourable conditions.

APPLE (*Pyrus malus*) BITTER PIT.

This trouble occurred in apples fairly generally throughout South Africa, specimens being received from apple growers in Rhodesia. It appears in fruit grown at almost any altitude, both at sea level and also in orchards at heights reaching to 5,000 feet above sea level. From observations which I have made on the subject for the past seven years, there is no doubt that the trouble is much more virulent and occurs more frequently in young vigorous growing trees, and as these trees grow older the disease becomes much less apparent. Much also depends on the character of the weather when the fruit is growing. Anything that tends to produce uneven periods of growth undoubtedly favours the appearance of Bitter Pit.

APPLE BITTER ROT (*Glomerella rufomaculans*) SP. & V. SCH.

This disease has been prevalent in the orchards of the Zoutpansberg district, Transvaal, and the Eastern districts of the Cape Province, including Albany, Bathurst, Graham's Town, King William's Town and East London. As far as I am aware it is at present confined to the above-mentioned areas, although it is more than probable that it occurs in the more humid parts of Natal.

Both in the Zoutpansberg and Eastern Province of the Cape the disease was particularly destructive, and affected more or less the entire crops. The fungus usually makes its appearance just about the time the fruit is ripening. So far it has only been reported as a fruit parasite in South Africa, and has not been associated with cankers on the limbs.

APPLE CANKER (*Sphaeropsis malorum*, Pk.).

Several instances of this trouble were reported, and in one instance from Natal serious damage was caused, the fungus killing the trees in every case when once they were infected. A piece of cankered bark from one of these trees is shown in Figure 4.

APPLE CROWN GALL (*Bacterium tumefaciens*, E. F. SMITH).

More complaints regarding this trouble have been received during the year than any other pest which was recorded, and there can be no doubt that Crown Gall is rapidly extending its range throughout South Africa. Not only does the organism *Bacterium tumefaciens* produce galls or cankers on the limbs, but it is also the cause of the disease known as "Hairy Root" of the apple, which has been responsible for the dying off of a large number of trees in various parts of the Union. During the year specimens of Crown Gall on Apricot, Peach, Pear, Plum, Rose, Vines, Walnut, Wattle and Willow were sent to the laboratory. A unique opportunity exists at Wakkerstroom in the Transvaal for conducting a stamping-out campaign against this disease, which is gradually attacking all the

woody plants in the town and which is causing considerable alarm among farmers and fruit-growers in the district. A sum of £1,000 to defray the cost of an eradication experiment at Wakkerstroom was placed on my estimates for the current year, but was disallowed before being submitted to Parliament for approval.

ARABIAN LUCERNE: DYING-OFF OF.

A number of reports regarding the unhealthy condition of this variety of lucerne have been received.

The plants as a rule appear quite healthy until almost ready for cutting, when they take on a very sickly appearance and soon begin to die off. In some cases plants were found infected with the mycelium of a *Fusarium*, while in others no parasitic organism could be detected. In a great many cases plots and stands of other varieties of lucerne growing alongside showed no symptoms of disease, and the general impression formed on examining such plots *in situ* was that the Arabian lucerne was suffering more from sun-scorch than anything else.

MAIZE COB MOULD (*Diplodia Maydis*. SACC.).

This trouble, frequently referred to as Mildew, has been particularly prevalent in Natal, and is of considerable importance not only from the serious loss that it causes in the yield, but also from the fact that mouldy cobs have very deleterious effects upon stock fed on them. Specimens of mouldy cobs were submitted for examination early in August last by Government Veterinary Surgeon Webb, stationed at Mooi River, Natal, who wrote as follows regarding them: "I am also sending some specimens of mealies taken from fields in which cattle have become sick, showing symptoms of intoxication and paralysis, due, I believe, to poisoning with the fungi on the mealies."

When I visited the Stuartstown district of Natal in October last, many of the farmers showed me samples of mildewed maize cobs which they stated caused them severe loss in their crops, and also produced severe paralysis and frequently death amongst stock that were fed on these cobs, especially if the cobs were damp and not properly dried out. Sheep were reported to be especially susceptible to sickness after feeding on such cobs. All the cobs examined from the various farmers proved to be infected with *Diplodia Maydis* Sacc. [Figs. 7 and 8.].

MAIZE LEAF SCORCH (*Helminthosporium turcicum*, PASS.).

This fungus was conspicuous on maize chiefly in Natal and Rhodesia, and will, I fear, become a serious pest in the cultivation of maize in the future. It first appears on the leaves in the form of small pale patches, which rapidly increase in size and spread out as elongated blotches reaching to almost the entire length of the leaf. These leaves soon become brown, dry and brittle, and in severe cases the whole plant has the appearance of being scorched by fire. Some varieties are much more susceptible than others, Natal White Horsetooth has been reported to be almost immune, whereas other varieties growing alongside have been completely destroyed.

MAIZE SMUT (*Ustilago maydis*, D.C.), AND (*Sorosporium reilianum* (KUEHN) MCALP.).

Both of these smuts occur generally throughout South Africa, although perhaps that due to *Sorosporium reilianum* is most frequently submitted for examination. Unfortunately neither yield to seed treatment, because all young and tender parts of the plants may be infected by the parasite. The only method of preventing the disease consists in cutting out, removing and burning all affected parts. Reports received leave no doubt that soil heavily fertilised with kraal manure usually develops a high percentage of smutted cobs.

PEACH BLACK SPOT OR FRECKLE (*Cladosporium carpophilum*, THUM).

This trouble which usually confines itself to the fruit appeared in a severe form on the twigs of young trees at the Cape Orchard Company orchards in the Hex River Valley, where the trees were reported to be suffering greatly, and from which the leaves dropped badly. The trees were also reported to have been badly affected by Silver Leaf the previous year. The attack of *Cladosporium carpophilum* was general throughout the whole of the peach orchards, and attacked

more or less all the trees. The fungus forms round blotches or blisters on the young twigs and these soon run together and give the twigs a very scorched appearance. [Fig. 9.]

PEACH SILVER LEAF.

Considerable work has been carried out in the laboratory on Silver Leaf during the past year, but up to the present it has not been possible to associate any parasitic fungus or bacterial organism with the phenomenon as it occurs in South Africa. During the past season silvering of the foliage occurred uniformly on all varieties of peach noticed in Pretoria. In certain instances the silvering was of a decidedly evanescent nature, especially in the case of seedling trees where the abnormal foliage was noted early in the season, but totally disappeared later on.

PEAR FRUIT END ROT.

Several complaints regarding the blackening of Bon Chretien pears were received during the past season. A similar trouble was reported in February, 1911, from Stellenbosch in the Cape Province, and up to the present it has only been noted in the Bon Chretien variety. The trouble begins as a blackening of the tissue round the calyx, and then gradually extends over the whole fruit. At first it was thought that it might be due to the injurious action of spraying, but subsequent examination of fruit from sprayed and unsprayed orchards does not support this view, and further the presence of one and the same fungus in the affected spots on pears from widely-separated areas points to the fact that the trouble is due to a species of *Cladosporium*. Further investigation of this trouble will be carried out at the first opportunity. [Figs. 10 and 11.]

PINUS PINASTER (*Diplodia pinea*, Kickx.).

Specimens of diseased pines from the Cape Province and Natal were submitted and were associated with the fungus *Diplodia pinea*. This fungus which is not looked upon as a serious parasite in other parts of the world, shows evidence of becoming one of the most injurious pests that the forester will have to contend with in South Africa. In addition to being a serious plantation pest, evidence is to hand in which *Diplodia pinea* has wrought considerable damage to pine seedlings in the nurseries.

POTATO.

Numerous specimens suffering from Bacteriosis (*Bacillus solanacearum*, Smith), Blight (*Phytophthora infestans*, De Bary) and Leaf Curl (*Macrosporium solani*, Cke.) were received from various parts of the Union. An almost equal number of enquiries regarding the spraying of potato crops and dipping of potatoes prior to planting were also addressed to the Division.

In imported potatoes scab was not so conspicuous, but a bacterial rot due to *Bacillus phytophthorus*, Appel, showed a marked increase in the consignments. [Figs. 12, 13, 14.]

ROSE MILDEW (*Sphaerotheca pannosa*, Lev.).

Numerous complaints regarding this trouble were received during the past year, and many growers reported that they got no success in treating the trouble with the solution of potassium sulphide that is usually recommended. As the laboratory now offers ample scope for a campaign against this pest, experiments with various sprays will be carried out during the year.

VELD GRASS.

Eragrostis plana and *Sporobolus indica*.

A species of *Epichloe* was very prevalent on *Eragrostis plana* in the Eastern portions of the Cape Province and on *Sporobolus indica* in Natal. This fungus is commonly known as the reed macè fungus and is of importance from the fact that it is reported to be injurious to horses fed on grass infected with it. [Fig. 15.]

[U.G. 47—'13.]

WATTLES: GUMMING OF.

Complaints regarding this trouble have been frequent and many growers are becoming considerably alarmed at it. A visit was, therefore, made to the chief wattle-growing districts in Natal from which the trouble had been reported. In some places the trees had completely recovered from the effects of gumming, but in others the trees refused to strip as a result of it. In nearly all cases the trouble was most prevalent in five-or-six-year-old trees, and especially in those trees which showed evidence of having made an exceptionally vigorous growth. [Figs. 16 and 17.] In those plantations where a fairly uniform rate of growth is maintained little or none of the trouble occurs, but wherever the trees are liable to sudden spurts of growth there the trouble appears most prevalent. A detailed histological study of the trouble in the laboratory has now been carried out by Mr. Van der Byl of this Division and his results will shortly be published. His work on the subject leaves no doubt but that the trouble is entirely due to unfavourable environmental conditions, and can not be associated with any parasitic organism.

DISEASES NOT PREVIOUSLY REPORTED.

Fungi of economic importance not previously reported from South Africa and now recorded for the first time include:—Apple: *Cytospora leucostoma*. Apricot: *Calosphaeria princeps*. Fescue Grass: *Claviceps purpurea*, Tul. Lemon: *Cladosporium citri*, Mass. Mangold: *Sclerotinia sclerotiorum*, Mass. Manna: *Ustilago Crammeri*, Korn. Naartje Fruit Scab: *Sporodësium* sp. Nectarine: *Calosphaeria princeps*, Tul. Onion: *Vermicularia circinans*, Berk. and *Myrothecium alliorum*, Berk. Orange: *Pleospora disrupta*. Peach: *Fusarium mutanimum*, Thuen. Plum: *Calosphaeria princeps*. Pomegranate: *Sterigmatorcystis* sp. Potato: *Sclerotinia sclerotiorum*. Sugar Cane: *Colletotrichum falcatum*. Tobacco: *Bacillus solanacearum*, Smith.

APPLE TREE DISEASE (*Cytospora leucostoma*).

Three distinct and widely-separated occurrences of this fungus causing the death of apple trees in the Cape and Orange Free State were submitted to the laboratory for examination. In all cases the bark of the trees had been attacked just above the ground, and trees up to seven or eight years old had been destroyed.

Whether this fungus is identical with that described by Cooke under *Valsa ambiens*, Fries, as being so destructive to bark of living apple trees has not yet been determined. As soon as the disease is detected in an orchard, affected trees should be taken out and burnt.

APRICOT TREE DISEASE (*Calosphaeria princeps*).

This fungus which is usually regarded as a saprophyte was first detected on apricot and plum branches submitted by a fruit grower in the Orange Free State, who complained of these trees dying off. A careful examination of diseased trees left no doubt but that the fungus *Calosphaeria princeps* has become an active parasite, and all the dead branches were studded with the black fruiting bodies of the fungus which raise the bark and split it in a very characteristic manner. [Figs. 18 and 19.] The fungus does not apparently kill the trees at once, but attacks the major branches first especially after the fruiting season. As soon as a branch is infected the leaves at the tip curl up and gradually the branch dies from the top downwards, and later on neighbouring branches contract the disease. The Victoria plum is said to be especially susceptible to the disease, while the variety of apricot known as "Moorpark" is also extremely susceptible.

The second outbreak of this disease was reported from Natal on apricots. A dozen trees out of fifty were affected, some were killed outright while others had one limb or half of the tree destroyed. In this case many of the trees were reported to have died quite suddenly, but here again it attacked the upper parts of the trees first, and then travelled down until it reached the main stem.

The third outbreak was noticed on Nectarine trees in the Stuartstown district of Natal, and here again the external symptoms of the disease was similar to those, described above. In all cases growers were advised to take out and burn all affected trees.

This is only one of many instances in which fungi which are usually regarded as saprophytic and innocuous in other countries, may under South African conditions assume parasitic habits and become very serious pests.

The possibilities of the stone fruit industry in this country are very great and it behoves us to take every precaution that we possibly can to safeguard such an industry from the various diseases and pests to which these trees are subject, and the fewer the trees we import from other countries the less risk we run in introducing these pests

FESCUE GRASS: ERGOT (*Claviceps purpurea*).

Tall fescue infected with Ergot was submitted by the Lecturer in Botany from the Potchefstroom Experimental Farm. This is the first occurrence of a *Claviceps* in *Festuca dattior*, and is important in view of the fact that this grass is one of our valuable forage grasses. *Claviceps* has also been collected on *Agrostis laenantha*, *Digitaria eriantha*, *Pennisetum macrourum*, *Pennisetum natalensis*, *Phalaris commutata*, *Phalaris bulbosa* and *Phalaris arundinacea*. Around Elsenburg in the Cape Province almost every plant of *Pennisetum macrourum* is year after year heavily infested with Ergot. Although this fungus is the well-known cause of disease in cattle, horses and man, so far as I am aware no complaints regarding ergotism are recorded from South Africa.

LEMON SCAB OR VERRUCOSIS (*Cladosporium citri*).

This trouble is prevalent in the citrus orchards of Natal, and effects both leaves, twigs and fruits. It is especially conspicuous on the latter, and attacks it at almost any period of its growth. The disease is characterized by the appearance of small corky warts on the parts affected. On the fruit these sometimes run one into another and cover the entire surface. The trouble has been reported most frequently from Zululand and East Griqualand. Frequent sprayings with Bordeaux mixture are recommended to keep the disease in check. [Figs. 20 and 21.]

MANNA SMUT.

This smut *Ustilago Crameri* Korn, was reported for the first time from Standerton in the Transvaal, and affected fully 50 per cent. of the crop. The crop was planted in new ground and was raised from locally-grown seed, along with which it must have been introduced. The fungus occurs commonly in Germany, Hungary and the United States, and affects nearly every grain in the head. It can be prevented by treating the seed with either hot water, formalin, or copper sulphate before sowing.

MANGOLD (*Sclerotinia sclerotiorum*, Mass.).

A large plot of mangolds in Natal was very seriously affected with this fungus, which destroyed fully 60 per cent. to 70 per cent. of the crop. All the diseased plants were covered with a copious white mould at the ground-line, and on this an abundant crop of sclerotia. The entire destruction of the crop was promptly advised.

NAARTJE FRUIT SCAB (*Sporodesmium* sp.)

Specimens of naartjes affected with a scab were submitted by a grower at Imbizana, Natal, who complained that all the fruit on his trees were diseased. The disease appeared the previous year, and showed evidence of becoming very destructive. The trees affected were described as young trees, being only eight years old. The cause of the scab was found to be a fungus belonging to the genus *Sporodesmium*, and which closely resembles a fungus described as *Sporodesmium griseum* by MacAlpine, on oranges and leaves in Australia.

Naartjes affected with scab are shown in Fig 22.

NECTARINE (*Calosphaeria princeps*, Tul.).

See Apricot.

ONION SCAB.

(*Vermicularia circinans* and *Mystrosporium alliorum*, Berk.).

Both these fungi were detected in a sample of onions submitted by a grower in Natal who complained that he was troubled annually with a disease in his crop. Both fungi are well known parasites of the onion, and produce what is commonly termed "Onion Scab."

[U.G. 47—'13.]

From a mere examination of the diseased bulbs it was impossible to say which of the fungi was the primary cause of the trouble, but the grower was advised to dip his bulbs in Bordeaux mixture and also spray the plants at frequent intervals. This was done and the grower writes saying that he never had seed promising so well and that he attributed it entirely to the treatment given.

ORANGE LEAF BLOTCH (*Pleospora disrupta*).

Specimens of this trouble were submitted by a citrus grower at Wellington in the Cape Province who stated that only one of his trees was badly affected, while it appeared on only a few leaves here and there amongst his other trees. The fungus forms large blotches on the leaves and the affected areas soon dry up, crack, and fall away. The leaves become so injured that they readily fall a prey to other leaf-destroying fungi. This fungus has been reported chiefly from Australia, where it does considerable damage to green leaves of the orange. [Figs. 23 and 24.]

PEACH MOULD (*Fusarium putaminum*, Thuem.).

On the 1st of February of this year the Director of the Cape Orchard Company, Ltd., submitted from Orchard Siding, Cape Province, a box of peaches which he described as being "badly infected with fungus," and which had been taken from trees which had been attacked by *Cladosporium carpophilum*. On opening the box the peaches were found to be covered with a dense snow white fungus growth, especially towards the apical end. The parts affected by the fungus were quite dry and mummified, while the unaffected portions were normal and juicy. In certain spots a distinct salmon pink to fawn colour was visible on the white felt-like mycelium, and this was found to be due to the sporodochia of the fungus, which belonged to the genus *Fusarium*. The general appearance of the fruit suggested that they had been placed in cold storage, but subsequent enquiry elicited the fact that this was not the case, and that the fruit was in this condition when picked from the tree. All the infected fruit that was examined showed evidence of external injury by some fruit puncturing insect, such as codlin moth or fruit fly, and this lent colour to the view that the fungus had obtained entry to the fruit through these wounds. [Fig. 25.] The fungus was identified as *Fusarium putaminum*, Thuem., originally recorded from Australia on rotten plums which were lying on the ground, and also from Australia on ripe apricots which had been kept moist.

As is mentioned above, the peaches were obtained from trees affected with the black spot or scab fungus *Cladosporium carpophilum*, and it is worthy of note that the Australian apricots attacked with *Fusarium putaminum*, Theum, were also "scabby."*

The Cape Orchard Company were advised to have all affected peaches collected and burnt, and this was promptly carried out.

POMEGRANATE ROT (*Sterigmatocystis* sp.).

In March, 1912, a complaint was received from the Resident Magistrate at Prieska, in the Cape Province, to the effect that the pomegranates in the town and district were affected with a rot. It was stated that no trace of disease was visible on the outside of the fruit, but on opening the fruit it was entirely rotten inside. It was at the same time that the rainfall in the district was extremely small and that the universal occurrence of the disease was, therefore, difficult to understand. Specimens were submitted for examination, and externally they appeared quite sound. On opening the fruit it was found to be discoloured almost black, especially towards the apical end, with a dark mould-like growth. [Fig. 26.] This proved to be a fungus belonging to the genus *Sterigmatocystis*. No account of any such disease could be found, but three months later an exactly similar trouble was described from America (1) under the title "A New external *Sterigmatocystis* rot of the Pomegranates," in which it was stated that in the summer of 1910 and 1911 it occurred as a serious disease in the South-western portion of the United States. The fungus causing the trouble was determined as *Sterigmatocystis castanea*, Patterson.

* Mc Alpine, D. Fung. Diseases of Stone Fruit Trees in Aus. 1902, p. 91.

(1) Mc Moran, S. M. Phytopathology. Vol. II, No. 3, p. 125.

Although the fungus occurring on the fruit at Prieska has not yet been compared with that described from America, there seems to be very little doubt but that we are dealing with one and the same disease, and it seems very probable that the fungus gains entrance either at the time of flowering or soon after.

POTATO STALK OR SCLEROTIUM DISEASE:

(*Sclerotinia sclerotiorum*, Mass.).

Specimens of potatoes affected with this trouble were submitted for identification by the Biologist from the Experimental Farm, Cedara. The potatoes were obtained from the Winkle Spruit Experimental Station, and it was stated that the fungus had attacked the plants just at the point at which the stem left the ground and had caused all the leaves to wilt and wither. The fungus was identified in the laboratory as *Sclerotinia sclerotiorum*, Mass., the cause of the well known potato trouble in Europe, and soon afterwards a visit was paid to the Winkle Spruit Experimental Station, where it was found that fully 75 per cent. of the crop was affected. The fungus being very conspicuous as a snow-white mould on the soil and emanating from the diseased stalks. The fungus readily attacks a very large number of cultivated plants and vegetables, and all diseased material should be promptly removed and burnt.

SUGAR CANE DISEASES.

Two distinct fungi on sugar cane were noted during the year, one, a species of *Sphaeronema*, was on cane submitted by the Natal Estates, Ltd., Mount Edgecombe, and was the cause of a black sooty mould, consequent on an attack of Aphis. About three acres out of a field of 49 acres were attacked, and close examination of the affected cane left no doubt that the fungus was merely saprophytic on the honeydew excreted by the aphides.

The other fungus, a species of *Phoma*, was detected on leaves of Demerara cane at the Experimental Station, Winkle Spruit, Natal. Other varieties of cane growing alongside and in close proximity to it showed no evidence of attack. Beyond forming small brown spots on the leaves, no apparent ill effects were visible on the affected cane.

TOBACCO BACTERIAL DISEASE.

Specimens of tobacco plants affected with a bacterial disease were submitted for examination by a grower at Fraser's, North Coast, Natal. The disease is similar to that known as "The Granville Tobacco Wilt" in the United States. It appears to have been prevalent in Natal along the Coast for the past five years. Plants are attacked at all stages of growth, but the disease appears to be most virulent just before flowering. The disease is readily recognised by the blackening stem and the slimy exudation on splitting it up.

LEGISLATION.

As a result of deliberations which I had with yourself and the Rt. Hon. the Minister for Agriculture in Cape Town in April, 1912, regarding the sorting of potatoes at the coastal ports, it was decided to modify the existing methods of procedure and adopt measures whereby all potatoes entering the Union should be submitted to fumigation by formaldehyde gas.

Fumigation chambers were accordingly erected at Durban, East London, Port Elizabeth and Cape Town, and all the past season's potato imports were submitted to the treatment, under the supervision of the Division of Entomology.

This method of treatment has, I think, given general satisfaction.

The Regulations designed to safeguard the Union against the introduction of Black Scab or Wart disease (*Synchytrium endobioticum*, Perc.) have been rigidly enforced, and so far as I am aware the Union is still free of this pest. The United States have recently followed our example in adopting legislative measures to prevent the introduction of Wart disease, but not until it had already been reported from America. The Americans have, however, gone a step further than we have, in that they have entirely prohibited the introduction of all potatoes from Newfoundland, St. Pierre, Miquelon, England, Scotland and Ireland, Germany and Australia, on account of the Wart disease.

If South Africa was in a position to be independent of the European markets for its seed potato supply, I should have no hesitation in recommending that similar steps be adopted here, and I feel confident that the day is not far distant when our growers will realise that this country must and can easily produce its own seed supply.

HERBARIUM.

Our work on the fungus flora of South Africa has been continued, and Miss Doidge, M.A., was responsible for the routine work in the Herbarium, which was exceptionally heavy. In all, during the period under review, 4,589 fungi were added to the Herbarium, registered, indexed and filed away.

In spite of the dry season, 740 South African fungi were collected and placed in the Herbarium. The remainder of the additions were composed of fungi from various exsiccata, and comprising:—

Cooke, Fungi Britannica	150 numbers.
Exsiccata, Herb. G. Farlow	44 „
„ „ De Thumen	8 „
„ „ P. Magnus	175 „
Flora der Sachsischen Schweiz	22 „
Flora Exsiccata Austr. Hungary	120 „
Kryptogamae Exsiccata Vindob	35 „
Kunze, Fungi Selecti Exsic.	68 „
Maire, Mycotheca Bor. Afric.	50 „
Rabenhorst, Fungi Europaei	1,997 „
„ Herb. Myc. Ed. II	132 „
Saccardo Mycotheca Veneta	900 „
Sydow, Fungi Exotici Exsicc.	50 „
„ Mycotheca Germanica	98 „

With a view of publishing a series of exsiccata at some future date, a number of fungi have been prepared in large quantities, and 34 have been put in mycological envelopes ready for distribution.

Miss Doidge has also made considerable progress with drawings and permanent preparations of the *Perisporiales*, a monograph on which she has under contemplation.

MANGO BACTERIAL DISEASE.

Miss Doidge has continued her investigations on this subject and has made some progress in the work on its physiology, special attention being paid to its susceptibility to the action of fungicides. She finds that mercuric chloride is the most effective in inhibiting growth, but unfortunately this cannot be used for spraying, as it is too dangerous a poison for that purpose. Hycol is also very effective, and experiments have been begun to test its efficiency for spraying purposes. Miss Doidge's researches on this organism in the laboratory has been supplemented by Mr. Van der Byl in the field. During the year Mr. Van der Byl visited Barberton six times in connection with the trouble. On four occasions he sprayed the trees with a solution of Hycol, using 1 part to 600 of water, and on the first three occasions he also treated the soil with Hycol, using 1 part to 300 of water.

His last visit was made in the second week in January, and he then reported that the sprayed trees showed 7.3 per cent. of diseased fruit, while the unsprayed totalled 16.7 per cent of diseased fruit. The season again was exceptionally dry and most unfavourable for any satisfactory results. The trees under experiment suffered so seriously from drought that during December estimated from a careful count that 38.8 per cent. of fruit fell from the sprayed trees and 36.1 per cent. from the unsprayed trees. It should also be mentioned that the trees were severely damaged by a hailstorm just before Christmas, and which rendered further spraying useless. The results obtained, although not altogether satisfactory, however, warrant us continuing the experiments.

GUMMING OF WATTLES (*Acacia molissima*).

As reported above, Mr. Van der Byl, B.A., has been engaged on the detailed investigation of this trouble in the laboratory, and he has briefly

summarised the results so far obtained as follows:—"This disease prevalent in Natal first appears as dark, sunken spots on the stem, later cracks appear in these spots and gum exudes. If gumming is not too severe a cambium may form and the wound heal, but should conditions favourable to gumming again prevail, gum may again exude from this spot. In this way the vital processes of the tree are greatly interfered with, and if gumming continues the tree ultimately succumbs.

No bacteria or fungus organism could be isolated from the gum spots, and the cause is probably due to some physiological trouble or disturbance.

Up to the present my investigation has been concerned chiefly with the chemistry of the gum, which is considered necessary, since gumming is such a conspicuous feature of the disease.

The gum varies greatly in consistency. It may be gelatinous and colourless and distinctly sticky or colourless and hard or again of a brown colour.

Only about 50 per cent. of the gum is soluble in water, and the solution is acid to litmus.

Nessler's Reagent in the cold gives a rose yellow colouration, and on standing a greyish yellow precipitate settles. If tartaric acid be added and then Nessler's Reagent, no change results. Warming the solution and then adding the reagent, an ash colouration is produced, and on standing a greyish blue sediment settles, here too, if tartaric acid be previously added no change results on adding the reagent.

Absolute alcohol and glacial acetic gives a curdy white precipitate.

Fehling's solution is readily reduced.

Acetic acid and potassium ferrocyanide gives a green opalescence.

Sodium Borate; solution thickened.

Dilute acetic (1.4); no precipitate.

Adamkiewicz Reaction; negative.

Buret Reaction; negative.

Alcoholic Potash; curdy white precipitate; liquid dirty yellow.

Phloroglucin & HCL. On boiling, the liquid changes through red to dark brown and brown particles appear in suspension, these settle as a dark brown, almost black precipitate.

Treated with Hydrochloric Acid, the gum yields furfural as tested with Aniline Acetate, Phloroglucin & HCL, and Phenylhydrazine Acetate. The liquid which distils on treatment with HCL has a distinct empyreumatic odour.

A portion of the gum heated with Orcin and HCL gave a fine blue precipitate insoluble in water but soluble in Alcoholic Potash to a brownish red solution, on boiling off the alcohol after addition of Hydrochloric Acid, a blue precipitate again results. Dextrin did not give this reaction.

With Nitric Acid the gum is readily oxidised to Mucic Acid, which is insoluble in cold but soluble in boiling water. Heated with concentrated Sulphuric Acid the solution of Mucic Acid first turned yellow and then crimson.

Two samples of gum yielded 73.44 per cent. and 72.43 per cent. respectively of moisture. Placed in a moist atmosphere these two samples took up after 48 hours 22.18 per cent. and 16.07 per cent. moisture respectively, and after four days 34.46 per cent. and 32.57 per cent. respectively.

One sample on incineration yielded 2.82 per cent. ash, and the ash contained 1.44 per cent. Calcium and .27 per cent. Magnesium.

The percentage of Galactan as determined from the weight of Mucic Acid formed on oxidation is 1.6.

The percentage of Pentosans was determined (1) from the weight of Phloroglucin, which a distillate with Hydrochloric Acid gave with Phloroglucin and Hydrochloric Acid, this method gave 5.4 per cent. Pentosans; (2) from the weight of Furfural Hydrazone, which a distillate with Hydrochloric Acid gave with Phenylhydrazine Acetate. This method gave 5.332 per cent. Pentosans.

A preliminary investigation showed that the gum is formed in the phloem of the stem and the gum pockets are situated around the hard bast fibres. Further investigation will determine the exact origin of the gum.

It is hoped that the results of this investigation will be completed in the course of the present year."

BLACK SPOT OF BUTTER.

In February last the Dairy Division asked our assistance with regard to a black spot in butter, which was causing a good deal of butter placed in cold storage at Standerton. The butter, after being placed in cold storage for about

[U.G. 47—'13.]

14 days, became disfigured with a number of black spots or blotches such as is shown in the Figure 28.

The trouble was investigated by Mr. Van der Byl in this laboratory, and from the black spots he succeeded in isolating a species of *Penicillium*, which is undoubtedly the cause of the discolouration. This was confirmed by innoculating cream before churning and by also innoculating butter after churning with pure cultures of the *Penicillium* obtained from the spots, when the characteristic spotting was reproduced.

At an early date further investigation will be carried out with a view to determining the stage at which the infection naturally occurs, and what means should be taken to prevent the same.

RED SPOT OF CHEESE.

During the year the Division of Dairying submitted a cheese for examination, the rind of which was covered all over with red spots. The trouble was stated to be common on cheeses from the dairies in East Griqualand. [Fig. 29.]

Mr. Van der Byl was given charge of the investigation as to the cause of the spotting. After a good deal of work on the subject, he succeeded in isolating a yeast from the spots time after time, but failed to get the red colour produced on any of the media employed, and cheese innoculated with the yeast did not develop the characteristic colour. In March last he visited East Griqualand in connection with the trouble, and from one of the culture plates poured on the farm obtained an organism which yielded the typical red colouration, and there now seems every likelihood of some light being thrown on this obscure trouble.

CEREAL RUSTS.

Owing to the fact that the Division had at its disposal no ground available for experimental purposes within reasonable distance of the laboratory, nothing in the nature of field experiments or observations were undertaken during the period under review, but some few infection experiments were conducted in the small lean-to greenhouse attached to the laboratory.

Chief among these was an experiment made with regard to a reputed rust-resisting wheat which had emanated from the Elsenburg Agricultural College. Unfortunately the wheat in question showed no evidence of any immunity worth mentioning.

The experiment to test the immunity of this wheat was conducted as follows:—Eighty plants of the “rust-proof” wheat and eighty of the variety known as “Wit Klein Koren,” which had proved itself from previous experiments to be extremely susceptible to rust, were raised under exactly similar conditions; the object being to compare the rust-resisting qualities of the “rust-proof” wheat with the one whose susceptibility to rust was well known. Forty of each of these plants served merely as controls, while the remaining forty of each were inoculated with the Rusts *Puccinia graminis*, Pers. and *P. triticina*, Eriks. & Huen.

The result was extremely disappointing, for it was found that the reputed “rust-proof” wheat was even more susceptible to rust than the susceptible variety “Wit Klein Koren.”

The actual results of the test may be briefly stated as follows:—Of the forty plants of the reputed “rust-proof” wheat which were inoculated all became infected and showed at the end of nine days from the date of inoculation a total of 2,555 rust pustules, whereas a similar number of “Wit Klein Koren” plants (the susceptible variety) only showed a total of 2,112 rust pustules. The control plants in both cases remained free from rust.

At the time that these inoculation tests were made, the view was expressed that the rust-resisting qualities of the “rust-proof” wheat had been much over-estimated, and it was predicted that field trials with this wheat in areas liable to rust epidemics would confirm the results obtained in the laboratory, and such has been the case with this wheat which was planted at Pretoria and Potchefstroom.

RAND MINE MOULDS.

Early in July last my attention was directed to some spraying experiments which were being conducted in the mines on the Rand in connection with a molasine treatment for the prevention of dust, and in which considerable difficulty was met in keeping down the growth of various mould fungi. I visited the City

Deep Mine on the 13th of the month and was shown over the sprayed portions by Mr. Lancelot Ussher, who was responsible for the molassine treatment. The experiments were being carried out with a view to alleviating the dust nuisance which is responsible for Miner's Phthisis or silicosis.

The experiments consisted primarily in spraying the plants with a 10 per cent. sugar solution, using Natal Molasses. From a dust-checking point of view this gave excellent results, except for the fact that it induced a copious growth of mould fungi wherever the spray lodged. The solution remains wet and sticky underground for four to five months in places that formerly were absolutely dry, and it was found from experiments that four gallons of the sugar solution laid the dust more efficiently than 2,000 gallons of water, which would mean an enormous saving of water on the Rand if the molassine treatment was universally adopted on the Mines, apart from its dust-allaying properties.

Samples of the moulds covering the sprayed surfaces were taken from various spots in the mine, and brought to the laboratory, where they were soon isolated in pure cultures, and it was found that the growths were due to three distinct fungi which thrive at abnormally high temperature, viz., an *Aspergillus*, a *Penicillium* and a *Mucor*.

The growth and behaviour of these fungi was then studied in the laboratory with a view to recommending a disinfectant most suitable for preventing their further appearance in the mines.

The fungi were grown on a 10 per cent. treacle solution in agar, to which different percentages of toxic substances were added, and after an exhaustive series of tests had been carried out, extending over four months, it was found that the disinfectant known as Hycol gave the most satisfactory results. One part of Hycol added to 1,500 parts of 10 per cent. treacle solution prevented any growth of any of the above fungi.

As a result of these experiments, the use of Hycol was adopted by Mr. Lancelot Ussher in his spraying experiments conducted in the City Deep Mine, and on the 4th of March last he wrote me as follows:—"At the City Deep Mine the mould has disappeared entirely from the places which it covered when sprayed last August, and the treacle has returned to its pristine stickiness. The rock looks as if it had been sprayed within the last hour or so, instead of six months ago. It gets better looking every day. Meanwhile the death-rate on the City Deep has dropped from the very highest to the very lowest and has now been the best for several months."

The above speaks for itself, and quite apart from destroying the moulds that are present and are apparent to the naked eye, it must be remembered that the use of such a powerful disinfectant in the mines must necessarily destroy a very large proportion of the microscopic organisms, including the pathogenic bacteria present in the dust.

As several species of *Aspergillus*, *Penicillium* and *Mucor* are pathogenic in man, a detailed study of the mould in question was deemed advisable.

As these obtained at the City Deep Mine could not be identified with any of the described forms, they were regarded as being probably new species, and were submitted to Sydow of Berlin for this authority's opinion on them. Sydow also agreed with me that the moulds were new to science, and he in turn forwarded them to Prof. Sartory of the School Pharmacy of Nancy. These fungi have been named *Aspergillus Sartoryi*, Syd. and *Penicillium Gratioti*, Sartory, respectively, and have been studied at the laboratory de Pharmacie chimique a l'Ecole superieure de Pharmacie de Nancy, and special attention has been paid to the possibility of their being pathogenic organisms. The conclusions arrived at by Professor Sartory are that neither of them is pathogenic to the rabbit or guinea-pig (1) and (2).

(1) Sartory & Sydow. Ann. Mycol. Vol. XI, No. 2, p. 156-160.

(2) Sartory, A. Ann. Mycol. Vol. XI, No. 2, p. 161-165.

WATTLE BAGWORM FUNGUS.

A considerable amount of attention has been devoted to this subject during the period under review. The fungus was first distributed in the plantations in November, 1911. It was then prepared in the form of a powder which was scattered by the wind through the bagworm-infested plantations.

When the plantations were examined in May, 1912, a number of bagworms were found infected with the fungus in the rows in which had been inoculated, although no external evidence of the fungus could be found in the plantations where it was originally detected and where it was so plentiful.

[U.G. 47-'13.]

This absence of any external evidence of the fungus in the latter plantation is accounted for by the fact that the season was an exceptionally dry one, and although on cutting open a number of bags mummified worms were found inside, the fungus had not developed beyond the sclerotial or resting stage. These preliminary trials were sufficient to convince one that the disease could be established by artificial means in uninfected plantations, and the experience gained led one to believe that better results could be obtained by modifying the methods of cultivating and distributing the fungus.

To minimise the risk of the fungus losing its pathogenic properties it was considered advisable to grow it on an extract of the insects which was sterilized by passing it through a porcelain filter instead of sterilizing the liquid by heat. At first considerable difficulties were met with in obtaining pure cultures of the organism by this method, but these were soon overcome and extremely satisfactory growths obtained.

Instead of distributing the fungus in the form of a powder as was done in the first trials in 1911, it was thought that better results would be obtained if the fungus could be placed in the plantations in such a manner that it would be free to develop and distribute itself whenever conditions were most favourable. Accordingly it seemed possible that this end might be obtained if the fungus cultures could be suspended to the trees in linen bags, through which it could develop as soon as the climatic conditions were suitable. As soon as vigorous cultures were obtained they were transferred to linen bags, and the contents allowed to slowly dry out just as might happen under natural conditions in the plantations.

These bags were then placed in a moist atmosphere in the laboratory, and the fungus very soon made a splendid growth through the bags exactly as was anticipated, and as is shown in Figure 30.

As soon as young worms were available for inoculation experiments a series of infection experiments were carried out in October, with the fungus obtained from the linen bags. The fungus proved to be extremely virulent, and killed off the young insects in three to four days from the date of inoculation. The results thus far obtained in the laboratory left nothing to be desired. The matter was then put to the test in the field.

In November, when the worms were nearly half-grown and were actively feeding, a number of these linen bags containing the fungus were suspended to trees heavily infested with bagworm, the idea, of course, being that as soon as the bags were soaked with rain the fungus would make its way to the exterior and shed its contagion all a round. Unfortunately the season again proved to be an exceptionally dry one, with the result that the fungus made no growth, and consequently no infection took place.

In a number of instances trees to which the fungus bags were suspended were found completely defoliated and nothing left on them but the fungus bag and numbers of healthy bagworms. A spectacle of this kind is certainly not encouraging, especially to a layman, but it must be realised that no infection can take place until the fungus has grown through the bag, exactly as happens in the case of infected bagworms. If the weather remains dry after infection has taken place, the bagworm merely becomes mummified and no further development of the fungus takes place until the bag is thoroughly soaked with rain. Then the fungus makes its way to the exterior in the form of the white powdery patches. Infection will then only result from these white spore masses if the bagworm is feeding. If the feeding period is over, the bagworm escapes infection for the season, and a huge waste of fungus spores takes place.

Thus it will be seen that in the natural course of events fungus infection of bagworms will depend largely on the character of the rainfall of the season. If early rains are experienced before hatching takes place, the fungus from previous infected worms will make its way to the exterior of the bags, and will be in a condition ready for infection as soon as the young worms hatch out. The more rain that falls during the feeding period the more havoc will the fungus bring about amongst the bagworms in the plantations, for the simple reason that if the conditions are favourable the development of the fungus may progress so rapidly that stricken bagworms may in turn infect their brothers and sisters before they are half or three quarters part grown.

On the other hand if the rains do not occur prior to and during the feeding period there will be very little if any fungus spores contaminating the plantations, and consequently little or no infection will take place. If the season remains dry during the feeding period, no further development of the fungus takes place in the recently infected worms, which merely become mummified and remain concealed in

their bags until a wet period sets in, when the fungus again comes to the exterior to shed its spores in the form of the white powdery patches on the outside of the bags. That a very large percentage of small worms are killed off by the fungus is certain, although these are as a rule not noticed or taken into account by the casual observer, because they very soon fall from the trees and are obscured on the ground underneath. However, careful search in sheltered plantations has revealed bagworms from the very earliest stages of growth up to maturity infected with the fungus.

The experience gained from the last season's field trials made it clear that considerable improvement would have to be made on the linen bag method of establishing the fungus cultures in the field, and if possible some means should be devised whereby these cultures when once placed in the plantations should not be entirely dependent upon the rainfall for their further growth. Consequently instead of placing the fungus-infected material in linen bags, it is intended to distribute it this season in tin cylinders enclosed in linen bags. The cylinders are perforated at their lower end, to permit of the exit of the fungus. The linen bags merely serve the purpose of suspending the cylinders, and at the same time will prevent them from too great exposure to the sun's rays.

Arrangements have been made to distribute some 500 fungus-infected cylinders amongst those wattle growers who suffer most severely from bagworm attack.

GENERAL.

A large and instructive exhibit was sent to all the principal Agricultural Shows in the Union during the year, and these were attended by one or more Officers of the Division.

The Correspondence for the year amounted to 1,590 letters despatched, while 1,366 letters were received.

Professor Pearson of the South African College, Cape Town, who has been making some investigations on the "Red Weed" or "Rooibloem" in mealies for the past two seasons, with a view to devising means for combating the pest, worked in the laboratory, and has made liberal use of the services of the staff and facilities afforded.

I. B. POLE EVANS,
Plant Pathologist and Mycologist



PLATE No. I.
TURKISH TOBACCO SEED BEDS, SHEWING PLANTS READY FOR TRANSPLANTING.



PLATE No. II.
TURKISH TOBACCO SEED BEDS, SHEWING CHEESE CLOTH COVERING.

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PLATE No. III.
FIELD OF TOBACCO, SHEWING METHOD OF COVERING SEED HEADS TO PREVENT CROSS-FERTILIZATION.
RUSTENBURG EXPERIMENT STATION

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OF THE
INDIAN

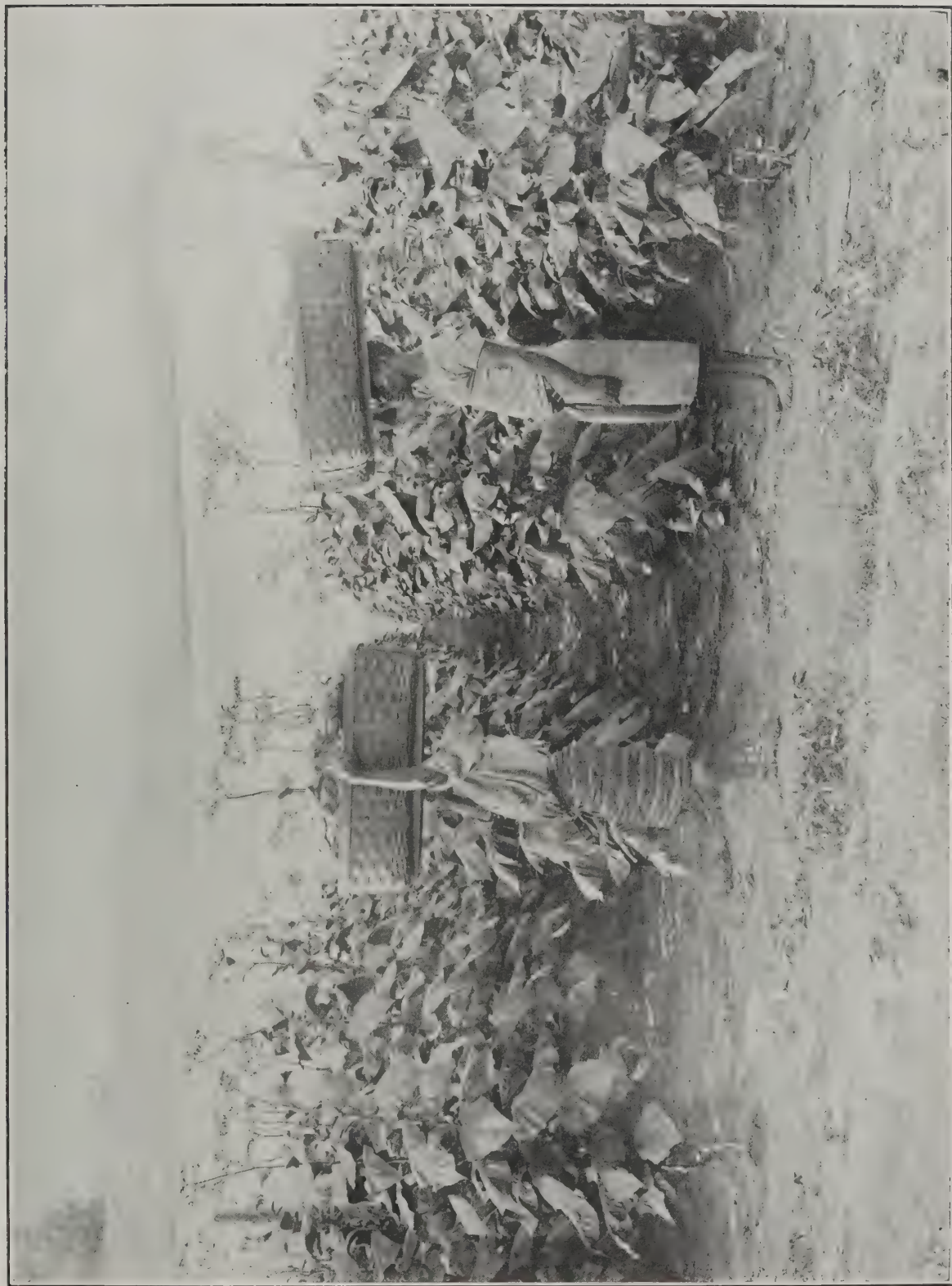


PLATE No. IV.
FIELD OF CIGAR WRAPPER TOBACCO AFTER FIRST PICKING.—BARBERTON EXPERIMENT STATION.

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OF THE

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1872



PLATE No. V.

FIELD OF CIGAR WRAPPER TOBACCO AFTER SECOND PICKING.—BARBERTON EXPERIMENT STATION.

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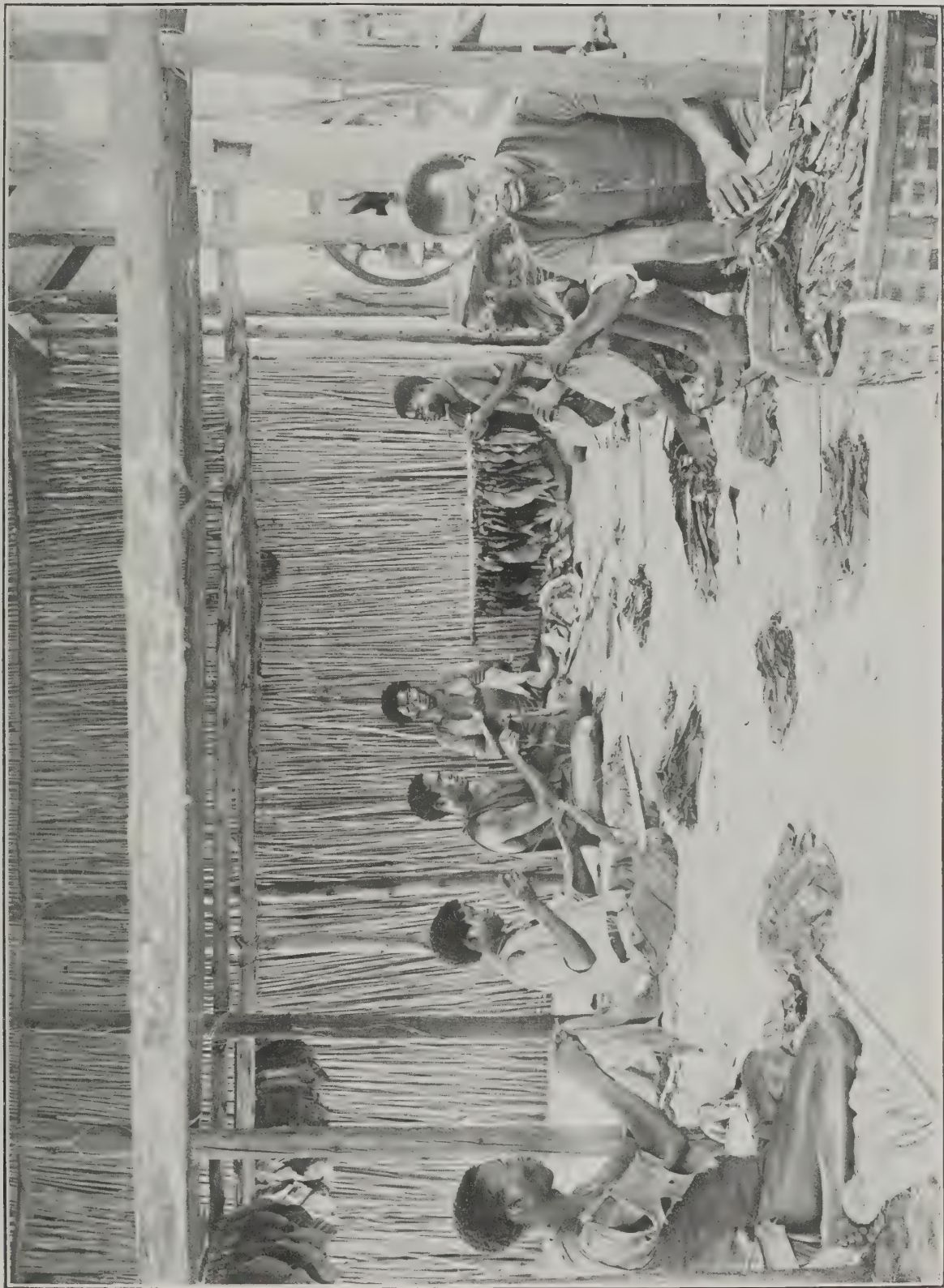


PLATE No. VI.

SHOWING METHOD OF STRINGING CIGAR WRAPPER TOBACCO ON LATHS BEFORE HANGING IN CURING SHEDS.—BARBERTON EXPERIMENT STATION.

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PLATE No. VII

A GOOD TYPE OF WAGON-FRAME FOR TRANSPORTING HEAVY TOBACCO TO THE CURING SHED.—BARBERTON EXPERIMENT STATION

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PLATE No. VIII.
THE COTTON PLANT (VAR. NYASALAND) GROWN ON MESSRS. WARDLOW & KIRSTEN'S FARM, TRANSKEI.



PLATE No. IX.
FIELD OF NYASALAND COTTON ON MESSRS. WARDLAW & KIRSTEN'S FARM, TRANSKEI.

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APPENDIX IX.

ANNUAL REPORT, 1912-13: TOBACCO AND COTTON DIVISION.

Department of Agriculture,
Pretoria.

The Secretary for Agriculture.

Sir,—

I have the honour to submit the first Report of the Tobacco and Cotton Division of the Union Department of Agriculture, for the period January 1st, 1912, to March 31st, 1913.

HISTORY.

The period under review includes the first year of the existence of this Division under Union. It may, therefore, be appropriate to give a brief outline of the progress made by the Tobacco and Cotton Industries in the four Colonies prior to Union.

CAPE COLONY.

Tobacco.—As early as 1886 the Agricultural Department had attached to it a Government Tobacco Expert, Mr. K. Schenck. The *Agricultural Journals* of 1888 contain articles and advice by him. Notices were published in the *Journal* that tobacco seed, of the improved American types, could be had on application to the Secretary for Agriculture. From that date, almost to the present, the Cape Government imported improved types of tobacco seed for distribution to the farmers.

In 1889 Mr. L. Simon was appointed Tobacco Expert vice Mr. Schenck, resigned. Mr. Simon arrived from London about May 1st. An article by him on Tobacco Culture was published in the *Agricultural Journal* of the 14th November, 1889, but he seems only to have remained with the Government for a year or so. About the same time a Tobacco Station was opened at Wignans River, near Oudtshoorn, and Mr. H. H. Davison was put in charge. On the 9th March and on the 29th June, 1893, there appeared in the *Agricultural Journal* lengthy articles on "Tobacco Culture" by Mr. Davison.

On the 9th February and the 6th April of the same year the *Journal* also contains articles written by Mr. P. Bornemisza, Assistant Tobacco Expert. During the next two or three years a number of articles written by the above-named gentlemen were published in the *Journal*; and inquiries from farmers were answered by them through the medium of the *Journal*.

After these men left the service questions pertaining to tobacco culture were dealt with by the officials in charge of the agricultural work.

On August 6th, 1896, Mr. L. M. Stella was employed as a "part time" officer, under Dr. Nobbs, Agricultural Assistant, and experiments with Turkish tobacco were commenced. On the 9th July, 1909, Mr. Stella was appointed on a twelve months' contract, assistant to the Agriculturist; and on the 1st July, 1910, he was re-appointed for a further period of two years as Government Tobacco Expert. On the 1st July, 1912, he was placed on the "fixed establishment" and attached to this Division.

During the past year the Chief of the Division and the Turkish Tobacco Expert attended a number of meetings of the Turkish tobacco farmers of the Western Province, C.P. The meetings were called for the purpose of giving advice on the formation of a Co-operative Warehouse Scheme, for properly handling and disposing of their tobacco crops. An organization was perfected, a building secured in Paarl, and everything put in readiness for the handling of this season's crop.

Cotton.—When the *Cape Agricultural Journal* was first published in 1888 it contained articles discussing ways and means of establishing a Cotton Industry in this country, and up to the present time this discussion has been going on. A great number of isolated successes and failures have been reported; but never has the industry had a real impetus. Quantities of cotton seed were distributed by the Department in an effort to get tangible results.

The British Cotton Growing Association devoted a lot of attention to cotton culture in the country, and spent considerable sums of money in supplying the seed, etc.

In 1909 Mr. P. J. du Toit collected comprehensive notes on cotton cultivation, yield and prices obtainable for cotton grown in Cape Colony. Referring to these notes, in the late sixties, good yields, as much as 613 lbs. of cotton lint per acre are reported. Encouraging reports came from various parts of the Colony, but principally from the Eastern Province. Samples were submitted to the British Cotton Growing Association, and good reports were made. In 1869 ginned cotton was sold in Grahamstown for 1s. per pound. In these early days several thousand pounds of cotton were produced and shipped to England.

Under the sub-heading "Causes of Failure," Mr. du Toit extracted from the *British and South African Export Gazette* as follows:—"Ignorance of the value of the higher cultivation, unsuitable seed, etc.; no labour-saving tools; no cheap fertilizers; ignorance of the value and non-utilization of the seeds for oil and cake manufacturers; seed sown at unsuitable periods; ineffective and inefficient labour; lack of cheap local transport facilities; high freights to Liverpool; lack of knowledge of how to combat insect pests; and finally, the superior attractions of the Diamond Fields and competition of the American industry." These "causes of failure" still exist to a certain extent, though some of them are considerably modified. The farmers are learning more about thorough preparation and cultivation of their lands; they are getting better tools and machinery; the price of fertilizers is becoming more reasonable; transport is getting much cheaper; sea-freights have been materially reduced, and the rush to the Diamond Fields is over.

In 1905 the Agricultural Department began a systematic attempt to distribute cotton seed and to supervise the culture for farmers. Trials were made at King Williamstown, Peddie, Albany, East London and Port Elizabeth. In 1909 Mr. Jas. Woodin was employed to supervise experiments at Uitenhage and Alexandria.

In July, 1910, a lengthy report on "The Cotton Growing Industry in Cape Colony" was written by Mr. W. J. Lamont, Acting Government Agriculturist.

In 1910 Mr. A. van Ryneveld, Agricultural Assistant at the Grootfontein School of Agriculture, was put in charge of the cotton work, and the following year, in co-operation with Messrs. Wardlaw and Kirsten, he produced a fine crop of cotton on 14 acres at the Big Umgazi, Transkei.

Late in 1911 the Chamber of Commerce of East London made strong representations to the Government to establish cotton experiments on their town lands for the purpose of determining whether cotton would grow profitably on the immediate coastal lands. The Chamber put considerable money into the proposition, and the Government was asked to help out with the experiment. We moved on the property during September, although it was almost too late to expect results during the season which was then at hand. Fifty acres were immediately broken and put in as good condition as could be expected considering the lateness of the season, and that we were working bare veld. As was feared, the crop did not come to maturity. In the spring of 1912-13 the field was divided into plots and again planted. Although this season was the worst that farmers have experienced for many years, some of the plots had a good stand on them, and the trees grew to a good size, measuring 5 feet high, and gave promise of a fair crop. Unfortunately, soon after the trees began flowering, they were attacked by Boll-worm and thousands of bolls were destroyed. While we succeeded in showing that cotton trees can be grown on the coast, the conditions on this plot are so adverse to cotton growing that we think it would never be a practical proposition for the farmers. Under these circumstances we think it advisable to shift this experiment inland ten or twenty miles.

NATAL.

Tobacco.—The first mention made in the *Natal Agricultural Journal* of any systematic endeavours on the part of the Government to establish tobacco growing is recorded on January 6th, 1899, when Mr. J. M. van Leenhoff was appointed

Tobacco Expert for the Natal Government. He served in this capacity about two years, and left the service in 1901. During this time he answered, through the medium of the *Journal*, inquiries from farmers, and encouraged the production of cigar tobacco. After his retirement inquiries regarding tobacco culture were dealt with by Mr. A. N. Pearson, Director of Agriculture.

In 1906 Mr. A. R. Sawyer was appointed Director of Experiment Stations, to succeed Mr. Pearson. From this time on, till Union, Mr. Sawyer wrote articles on tobacco culture (see "Cedara Memoirs," by Sawyer) and answered inquiries pertaining to tobacco.

Cotton.—Although the Natal Government has never had a Cotton Expert, articles on cotton culture have been published in the *Agricultural Journal* as early as 1898. In these articles, the Right Hon. Cecil Rhodes is spoken of as one of the early pioneers in cotton growing in Natal. Mr. J. Kirkman, Esperanza, grew cotton and produced as much as 300 lbs. of lint per acre in 1871. Mr. W. H. James planted, in the early days, as much as fifty acres one year, and got 300 lbs. of lint per acre. After the Civil War in the United States there was an increased output of cotton and the prices fell. Then came a rush to the Kimberley Diamond Fields, and the cotton industry in Natal came to an end.

During Mr. Pearson's time as head of the Agricultural Department and later, during Mr. Sawyer's, an effort was made to revive an interest in cotton culture, but the industry was never established. Mr. Pearson wrote a number of articles on cotton culture for the *Journal*, which were later published as a bulletin.

After Mr. Pearson's retirement Mr. Sawyer also wrote a number of articles and a bulletin on cotton culture (see "Cedara Memoirs," by Sawyer). For many years the Government distributed quantities of cotton seed to farmers for trial, and gave advice on cotton culture. Many samples of Natal-grown cotton were submitted to the Scientific and Technical Department of the Imperial Institute, London, for an opinion. The reports usually graded Natal cotton a little higher than American middlings.

ORANGE FREE STATE.

Tobacco.—In 1905 Mr. G. Shaw Scott, Horticulturist, distributed seed of improved types of both American and Transvaal tobacco, and wrote Bulletin No. 1 on "Tobacco Culture and Curing." Mr. Christian Schoeman was sent to America by the O.F.S. Government for eight months to study tobacco culture, and on his return to the Orange Free State, November 17th, 1906, he wrote a report on his studies and travels, which was published in the third Annual Report of the Department.

The fourth Annual Report, for 1907, contains a short Notice to the effect that he began experiments on tobacco culture on a ten acre plot near Vredefort.

The fifth Annual Report, and those succeeding, make no mention of his work. Evidently the Government did not continue these experiments. This was apparently the only attempt the Government made to supply an expert to assist in tobacco culture.

Cotton.—Apparently no expert advice has been supplied further than the answering of correspondence by officials in charge of the agricultural work.

TRANSVAAL.

Tobacco.—In 1903 the late Crown Colony Government purchased the Tzaneen Estate, which had obtained a reputation as a tobacco estate, for the purpose of land settlement. Mr. Altenroxel, one of the late co-owners of the estate, was employed as manager, and under his direction many improvements were effected on the estate, and a factory was erected at a considerable expense for the manufacture of tobacco, cigarettes, cigars and snuff, with a view to its being run by the Settlers as a co-operative undertaking as soon as they were in a position to do so, and advances were made in the growing, curing and manufacture of tobacco. Unfortunately the settlement proposals proved premature, as on the one hand there appeared no prospect of the factory being conducted as a co-operative concern in the near future, and as the tobacco manufacturers, not unnaturally, protested against the Government embarking on a purely business enterprise the factory was closed down, and it was decided that the Tobacco Division of the Department should act as caretakers of the estate, and conduct certain experiments with tobacco,

cotton and sub-tropical fruits on it, until such time as the Government had decided what to do with the estate.

In 1906 Mr. Altenroxel resigned, and Mr. W. H. Charter was appointed Acting Manager; and in April, 1906, Mr. J. van Leenhoff was appointed Tobacco Expert, and a little later a Tobacco Division was formed with Mr. van Leenhoff as Chief, and a Tobacco Experiment Station was established on the town lands of Rustenburg. Later, Experiment Stations were established in the Barberton and Piet Retief Districts.

In 1909 the present Chief of the Division was appointed to succeed Mr. J. van Leenhoff.

In January, 1908, the Minister of Agriculture appointed a Committee—consisting of Mr. F. B. Smith, Director of Agriculture (Chairman), Mr. H. A. Baily, Sir Thomas Cullinan, M.L.A., Mr. H. Mentz, M.L.A., the Hon. A. Bailey, M.L.A., and the Hon. G. G. Munnik, M.L.A.—to advise the Government in regard to the best method of developing the tobacco industry in the Transvaal.

The Committee were to enquire into and report with recommendations in regard to:

- (a) The whole question of tobacco growing, curing, and packing.
- (b) The best method to be adopted for the building up of a sound industry, and the most suitable places for the erection of warehouses, etc.
- (c) The best method of expending the item of £10,000 set aside in the expenditure estimates for 1908 for the promotion of the tobacco industry upon lines approved by the Right Hon. the Minister of Agriculture.

After a number of meetings of the Committee had been held, at which many phases of the industry were discussed, reports on the progress of the Committee's deliberations were made to the Right Hon. the Minister of Agriculture.

The Government then proceeded to erect and equip a tobacco warehouse at Rustenburg. The services of a Warehouse Expert were procured to give advice as to operations of the warehouse and treatment of the leaf. The concern was then handed over to the Rustenburg Tobacco Planters' Association. The business of the Association is controlled by a Board of Directors elected by the members. The Association numbers about 2,000 members, and is organized according to the Government rules and regulations governing the management of all such co-operative societies in the Transvaal.

The members bring their tobacco to the warehouse, where it is weighed, sorted, graded, baled and disposed of to the manufacturers.

Cotton.—Soon after the purchase of the Tzaneen Estate, cotton cultivation was undertaken on it, and later, under the supervision of the Government Agrostologist and Botanist, experiments in cotton cultivation were made at Skinners Court. In 1910 cotton investigations were transferred to the Chief of the Tobacco Division, and the name of the Division was changed to "Tobacco and Cotton Division." Experiments in cotton culture are being conducted at all of our Stations.

A number of farmers have grown a few acres of cotton, and have reported successful crops. Had it not been for the severe drought this year, there would have been a considerable acreage planted.

GENERAL.

Prior to the war a considerable quantity of tobacco was grown in certain districts in the Union, in some instances for home consumption only. In the earlier days many farmers used it largely as a medium of exchange, and later, when manufacturing were established, a large percentage of the leaf tobacco was sold to them. There existed a good local market in South Africa for Boer tobacco long before the Government formed the present Department of Agriculture. Generally speaking, the production was confined to heavy or pipe tobacco. Bright or cigarette varieties were produced only in small quantities, and the South African cigarette is a product which has only during the past few years become what may be termed an article of marketable importance.

A fair quantity of the leaf was manufactured by the growers themselves, and even to-day this is done to some extent, although the manufacturers' demands have increased considerably. The increased quantity of leaf handled by manufacturers in their factories has, naturally, resulted in an improvement of the manufactured product. This fact accounts for many persons, interested in the export trade,

inclining to the opinion that a market for Boer tobacco could be found in Europe, that is to say, for the brands put up in bags by South African manufacturers.

It is thought that the better plan would be to export the unmanufactured product, thus leaving the manufacturers in Europe to put the leaf to what uses they consider most profitable. Indeed, to experiment along such lines, would serve to prove whether South African leaf could be used in the manufacture of some of the established brands of so-called American or "fancy" tobaccos for which a large market already exists all over the world.

During the year I paid frequent visits to the Government Experiment Stations at Rustenburg, Barberton, Tzaneen, Piet Retief and East London; to the Turkish tobacco experiments in the Western Province C.P., and to the Government Tobacco Warehouse, Rustenburg. Numerous farmers have been visited by members of the staff, to give advice when required.

Representatives of the Division have attended a number of meetings of Farmers' Societies to lecture on topics pertaining to tobacco and cotton culture.

During the period under review 8,698 letters and telegrams were received and despatched by this office.

Monthly reports have been made to the Secretary for Agriculture detailing the progress of the work. A number of special reports have also been prepared during the year.

The demand for tobacco seed of our improved types has so increased that we find it difficult to produce a sufficient quantity of seed to fill the orders. We sold tobacco seed at 1s. per ounce for all types except Turkish; they were sold at 4s. and 5s. per ounce. We filled orders for 823 parcels during the year, and had a great many applications for seed after our supply was exhausted.

We sold cotton seed in bulk at 3d. per pound, and sent out 52 parcels of seed during the year.

Numbers of small trial packages of both tobacco and cotton seed were sent out, free.

Interviews with growers, or intending growers, have been of almost daily occurrence and representatives of the Press have interviewed members of the staff on several occasions. In this way articles have reached the Press, recording the progress of the tobacco and cotton industries. Popular articles of this nature should prove useful in attracting the attention of the farming community to what is being done.

The number of letters dealt with in this office does not convey a correct idea of the amount of time required by them. Frequently sweeping inquiries regarding the best methods of cultivation and treatment of the different types of cotton and tobacco are made. Such letters require replies giving lengthy detailed instructions. We have commenced the publication of a series of bulletins containing the information generally sought by the public. As these bulletins are published, they can be sent out in reply to inquiries, and thus relieve the burden of correspondence.

GOVERNMENT TOBACCO AND COTTON EXPERIMENT STATIONS.

This Division has at present five Experiment Stations located at Rustenburg, Barberton, Tzaneen, Piet Retief and East London. The object of these Stations is :

- 1st. To determine, by variety tests, which varieties of tobacco and cotton give the best results in different districts and on different kinds of soil.
- 2nd. To carry on fertilizer and rotation experiments with these crops.
- 3rd. To produce improved seed for distribution to farmers.
- 4th. To demonstrate the use and methods of operating flue barns for curing tobacco; and to determine what kind of air-curing sheds are most profitable to use.
- 5th. To show the most improved methods of handling and producing cigar wrapper tobacco.
- 6th. To demonstrate whether these crops can be produced at a profit.
- 7th. To test methods of combating insects destructive to these crops.
- 8th. To teach students the best methods of producing these crops.
- 9th. In connection with our experimental work, we keep daily records of the temperature and rainfall at each Station.
- 10th. In addition to conducting experiments at the five Stations, we continued itinerant work in the Western Province, C.P. Our duties in this connection

[U. G. 47—'13.]

are to advise the farmers as to the best methods of producing Turkish tobacco.

- 11th. Experiments with crops on land that has been subsoiled with dynamite as compared to land that is not subsoiled with dynamite.
- 12th. Testing the different thicknesses of sowing tobacco seed in the seed beds.
- 13th. Growing tobacco on dry land in comparison with tobacco grown on constantly flooded land in order to determine which crop carries the greater percentage of nicotine.
- 14th. Comparing tobacco grown from heavy seed with tobacco grown from light seed, to determine which will give the greater yield.

At two of the Stations ginning plants are in operation, to gin the cotton grown in our experimental fields ; also to gin for farmers in the surrounding districts.

Besides cotton and tobacco, other crops such as Soybeans, Velvet Beans, Mealies, Oats and Ground Nuts are grown. These are grown for rotation purposes, as well as to feed the natives and animals.

An experimental field of sugar cane, comprising about 15 acres, including eight or ten varieties, was planted at Tzaneen Estate during September, 1911. At present the prospects are splendid, and indicate that sugar cane can be successfully grown in the Low Country of the Eastern Transvaal. This cane is now about 18 months old, and will soon be ready for milling.

The ensuing year we will include in the above list :—

- 1st. Fertiliser experiments with crops on turf and sandy loam soils.
- 2nd. Commercial field trials.
- 3rd. Comparing the results obtained in different kinds of air-curing sheds.
- 4th. Yellowing green tobacco in the field and in the sheds.

Urgent requests were made to the Government to extend the scope of work at Tzaneen Estate to include horticultural and botanical investigations. The Government realize that, although the Zoutpansberg has a good future, it is backward in improved methods of dealing with these branches of agriculture. To meet these needs, a series of experiments was commenced in October, 1911. While the immediate supervision of this work is in the hands of the Officers of this Division, the work is actually controlled by the Divisions concerned. I feel it my duty to again call your attention to the fact that, although the Tzaneen officials are struggling hard with their many and varied lines of work, we can never make the Station what it should be with the limited staff and appliances at our disposal. On such a large estate much time and energy must be devoted to the upkeep generally and to the growing of crops commercially to meet expenses, and, while this must be done, it is to the detriment of experimental investigations, which should be the main work of an experiment station.

If we had, say, 500 acres instead of about 9,000 acres, with our present staff, we could do work of a much higher order, and work that would be a lasting benefit to the country.

STAFF.

The staff changes during the year have been as follows :—E. H. T. Powell, Officer-in-Charge of the East London Station, has been transferred and promoted to Officer-in-Charge at Tzaneen Estate, vice O. B. Chisholm, resigned ; L. M. Stella, formerly on contract, has been placed on the fixed establishment ; D. D. Brown, a former student at the Rustenburg Station, was appointed as Officer-in-Charge of the East London Station ; C. A. Pereira, a former student of Potchefstroom Agricultural College, was appointed Foreman at the Rustenburg Station, vice H. W. Ruscoe, resigned ; L. Zeederberg, a former student at Tzaneen, was appointed Foreman, vice G. Hatton, resigned.

The present staff of the Division is as follows :—Chief, W. H. Scherffius ; First-class Clerk, T. A. J. Place ; Clerk, J. de Ridder ; Assistant for Fermenting Experiments, G. van Belkum ; Typist, Miss Z. M. Welsford. Officers-in-Charge of Experiment Stations :—H. W. Taylor, Rustenburg ; E. H. T. Powell, Tzaneen Estate ; W. B. Wilson, Barberton ; R. T. Falgate, Piet Retief ; D. D. Brown, East London. Warehouse Expert, T. E. Elgin, Rustenburg ; Officer-in-Charge of Turkish Tobacco Experiments, Western Province, C.P., L. M. Stella.

I wish to take this opportunity of expressing my appreciation of the assistance rendered by the staff in carrying on the work of the Division. The progress of work which we are able to report has been largely due to the united efforts of the entire staff.

AGRICULTURAL SHOWS.

At all the principal Agricultural Shows, and at a number of the smaller ones, the exhibit of the Division was to be found. It consisted of tobacco, cotton, charts, illustrations and bulletins. Although three years ago we had practically nothing suitable for exhibition, we have gradually added to our collection until now it is quite creditable. It has been our aim to make it an educational feature and not merely a show exhibit. A member of the divisional staff is always in attendance to explain the charts and to give any information desired in connection with the work of the Division. I find that when a member of the staff is present, the public take more interest in the exhibit, and in this way, too, we meet a great many farmers with whom we do not come in contact in other ways.

It is an admitted fact that the agricultural show is a splendid factor in disseminating knowledge concerning modern methods of agriculture, and I am convinced that by exhibiting our superior products and explaining to the farmers how they were produced they are induced to strive to produce something equally as good.

The increasing demand for a member of this staff to act as judge of tobacco and cotton at the various shows is an indication that our decisions in the past have been acceptable, and that the public are recognising the capabilities of the Government officials.

During the coming season we have arranged to place our exhibit on all the principal Shows in the Union, and at the same time we do not intend to neglect the so-called "Country Shows." I have observed that at some of the smaller Shows there are frequently more *bona fide* farmers in attendance than are to be found at the larger Shows.

At the Witwatersrand Show held in March, 1913, prizes were awarded for South African-grown cotton, for which five or six entries were received. The samples were sent to the British Cotton Growing Association, Manchester, to be judged, and the first prize was awarded to Messrs. Wardlaw and Kirsten, Port St. John's; the second prize was awarded to H. H. Dilley, Tzaneen.

A similar competition has been arranged for the 1913-14 Witwatersrand Show.

PUBLICATIONS.

In addition to a number of articles published in the *Agricultural Journals* and in the Daily Press, a bulletin on "Cotton" was issued during the year.

STUDENTS.

During the past year we have accommodated at different times 13 students on our Stations. With one or two exceptions these young men have taken a keen interest in the work, and some of them have proved themselves quite capable. In some cases they have left us to begin farming on their own account or to take up more responsible positions. The students are paid 3s. per working day, and are provided with furnished quarters. They are required to provide their own food, but where several of them mess together their expenses in this connection are not heavy. At present we have three students at Rustenburg, one at Piet Retief and one at Tzaneen.

TOBACCO WAREHOUSES.

On the completion of the Tobacco Warehouse at Rustenburg, in the early part of 1911, it was handed over to the Magaliesberg Tobacco Planters' Co-operative Association, on a three years' lease, for £24 per year. It was, however, late in the season before the warehouse was ready for occupation. The Society handled one and a half million pounds of tobacco during the year, having apparently done remarkably well. This year the Society has increased its membership to more than 2,000 tobacco growers. The Society closed the year's work at the end of December, after having dealt with nearly two and a half million pounds of tobacco, an increase of one million pounds over the first year's business.

Last year the Co-operative Society erected, on its own account, a large brick shed, 100 feet by 200 feet, for storage purposes. The need of more storage room was badly felt, and when the new shed was erected it greatly facilitated the work. The Warehouse officials have had to contend with many new and untried conditions and complications peculiar to this country. There is no doubt that the advice, painstaking and careful course pursued by the Warehouse Expert has contributed largely to the success of the undertaking.

The Turkish tobacco farmers of the Western Province, C.P., after a sad experience with their 1911-12 crop of tobacco, saw the need of a warehouse; they have, therefore, formed a Warehouse Company and rented a building at Paarl, in which they will handle their 1912-13 crop.

A movement is on foot at present to organize the tobacco farmers of the Vredefort District, O.F.S., into a Co-operative Society, for the purpose of handling their tobacco crop.

THE COTTON CROP, SEASON 1911-12.

The cotton grown on the experimental fields at the Government Stations, and that grown by farmers in the vicinities of the Stations, was ginned at Rustenburg and at Tzaneen by Government gins. Private enterprises, for example, Captain Elphick, Malelane, Transvaal; Nathanson Commandite, Durban, Natal, and the Chamber of Commerce, East London, also operated gins to gin their own and their neighbours' crops.

We have invited local tenders to dispose of the 1912-13 cotton crop, but so far we have not accepted an offer.

CO-OPERATIVE EXPERIMENTS.

The cotton experiments at Blaauwberg, Transvaal, are being continued again this year. Reports from there indicate that progress is being made. The experiments conducted at the Big Umgazi, Transkei, last year, which were so successful, are being continued this year.

A series of fertilizer and crop rotation experiments were commenced this year in Ward II. of the Piet Retief District. The first year, of this four years' rotation, the plots were planted to mealies. (See Appendix D for report.)

RETURN OF THE TOBACCO IMPORTS AND EXPORTS OF THE UNION DURING THE YEAR ENDED 31ST DECEMBER, 1912.

Imports.

Unmanufactured Tobacco	..	..	891,979 lbs.	£39,574
Manufactured Tobacco	..	..	51,150 "	5,585
Cigars	..	..	134,962 "	54,479
Cigarettes	..	..	246,685 "	76,414
Total	..	..	1,324,776 "	£176,052

Exports.

Unmanufactured Tobacco	..	..	48,051 lbs.	£1,354
Manufactured Tobacco	..	..	92,978 "	8,597
Cigars	..	..	123 "	35
Cigarettes	..	..	12,323 "	2,375
Total	..	..	153,475 "	£12,361

The above table of tobacco imports and exports was furnished by the Department of Customs. This table shows that the imports exceed the exports by 1,171,301 pounds weight, and no doubt most of this imported tobacco is of the Virginia type. We can, therefore, see the need of doing more to encourage the curing of tobacco by the flue curing process, in order that we may supply this article from our home production.

FINANCE.

The following statement shows the cost of our Experiment Stations, other than salaries paid to Officers-in-Charge, during the financial year 1912-13 :—

	Amount of Grant.	Expenditure.	Excess.	Saving.
Rustenburg ..	£1,120	£1,167	£47	..
Barberton ..	750	738	..	£12
Piet Retief ..	750	715	..	35
Tzaneen	1,800	1,685	..	115
East London ..	300	404	104	..

In the case of East London the excess of £104 is accounted for by the fact that it was the intention to debit the salary of the Officer-in-Charge to the item for Co-operative Cotton Experiments, but the Audit Office refused to allow this course, and there is, therefore, a corresponding saving on the cotton item.

The following table shows the approximate amounts expended at each Experiment Station ; on permanent improvements, the purchase of animals, implements and the like, as distinct from the current expenditure :—

	Permanent.	Current.	Total.
Rustenburg ..	£200	£967	£1,167
Barberton ..	145	593	738
Piet Retief ..	110	605	715
Tzaneen ..	142	1,543	1,685
East London ..	..	404	404

Revenue.—The revenue returned during the period under review amounted to £1,210 10s. 11d., made up as follows :—

Rustenburg Experiment Station	£531 18 9
Barberton Experiment Station	36 12 9
Piet Retief Experiment Station	156 7 11
Tzaneen Experiment Station	451 6 9
Turkish Tobacco Experiments	34 4 9
	£1,210 10 11

I have the honour to be,

Sir,

Your obedient Servant,

W. H. SCHERFFIUS,

Chief of Tobacco and Cotton Division.

APPENDIX A.

REPORT OF THE RUSTENBERG EXPERIMENT STATION.

By H. W. TAYLOR, B.S.Agr., Officer-in-Charge.

To the Chief of the Tobacco and Cotton Division, Pretoria.

Sir,—

I have the honour to submit to you the following report on the work performed on this Station during the period 1st January, 1912, to the 31st March, 1913.

During the year under review the Officer-in-Charge was absent on duty fourteen times, for the purpose of attending Agricultural Shows, or to visit farms for the purpose of giving advice on tobacco or cotton cultivation.

[U.G. 47—'13.]

STUDENTS.

Eleven young men were enrolled as students. They were given practical field instructions in all of the various details of tobacco and cotton production, together with other routine work which is necessary on an Experiment Station. At present only Messrs. Kotze, Baillie and Davis are students here, the others having obtained positions or are farming on their own account.

WEATHER.

The weather conditions were very unfavourable to the growth of field crops. The Spring rains were late and scant, this considerably impeded the preparation of lands for tobacco and cotton, and also caused the cotton seed planted to germinate badly.

In most parts of the District the rainfall was too scant to cultivate tobacco on dry lands, and in many places the supply of water for irrigation became exhausted so that the tobacco crop was far short of what was expected.

The rainfall was as follows :—

Year.	Month.	No. Inches.	No. Days.
1912	January ..	3·81	11
"	February ..	4·98	13
"	March ..	3·57	9
Total for three months		12·36	on 33 days.
"	April ..	0·50	4
"	May ..	0·51	3
"	June ..	0·00	..
"	July ..	0·00	2
"	August ..	0·00	..
"	September ..	0·05	2
"	October ..	1·21	11
"	November ..	0·63	8
"	December ..	5·96	18
1913	January ..	1·47	9
"	February ..	3·61	12
"	March ..	3·41	9
Total for twelve months		17·35	on 78 days.

CORRESPONDENCE.

During the fifteen months just passed 675 letters were received and 688 were despatched, besides the usual monthly reports and five reports on the suitability of certain farms for tobacco and cotton culture.

LIVE STOCK.

The live stock on the Station consists of 15 work oxen, 10 mules and 2 horses. One ox died during the year, but otherwise the stock remained in healthy condition.

MEALIES (*Zea mays*).

To reduce the cost of maintaining the Station we try to produce sufficient mealies for the natives employed and for the mules and horses. About twenty acres were planted to mealies, but the dry season cut the crop short. From the twenty acres we harvested 120 bags, or an average of about six bags per acre. This amount was practically enough for our own use.

OATS (*Avena sativa*).

Nine acres were seeded to oats to harvest as forage for the mules and horses. On account of the dry weather we were very short of water for irrigation, and had to abandon one three-acre plot in order to have sufficient water to mature the remaining six acres. From the six acres we harvested 12,600 lbs. of forage.

COTTON (*Gossypium hirsutum*).

On account of the extremely dry season the cotton crop was not as successful as in previous years. Our crop was planted on three types of soil : light red, sandy loam, grey sandy loam, and black turf. The cotton on the light red sandy loam was planted on 24th and 25th October, and was up by the 5th to the 7th of November ; the stand was excellent. On account of the soil being very poor in plant food and because of the scant rainfall, the plants made poor growth, and the yield was therefore low, as will be seen by referring to Table 1.

The highest yield in the variety tests was made by Bohemian, and the lowest by Christopher. The cotton planted on the grey sandy loam was Christopher and Cleveland. This plot was not seeded until the 11th November ; but since the soil was fairly good, the yields were better than was expected for the season. Christopher gave a yield of 250 lbs. of lint per acre, and Cleveland 293 lbs. of lint per acre. The turf soil was planted early in November, but there was not sufficient rain to wet this type of soil sufficiently to cause the seed to germinate until the middle of December. This was too late for cotton to reach maturity, so we harrowed over the land and planted it to mealies.

The farmers of this District are evincing great interest in cotton cultivation, and many are starting to grow the crop in a small way. This season the farmers of the Rustenburg District produced 14,737 lbs. of lint. This is not a bad start when we consider that no attempt at cotton cultivation had previously been made, and the farmers had no practical experience in handling the crop. Had the season been a favourable one, the cotton crop would have been several times as large ; but on account of the drought, many could not prepare their lands, and the stand was bad on the lands planted.

Part of the cotton grown by the farmers was ginned at this Station, and the remainder at the Rustenburg Farmers' Co-operative Society, where a saw gin has been installed.

TOBACCO (*Nicotiana Tabaccum*).

Our tobacco work included Variety Tests, Flue-curing, Air-curing, Open-fire Curing and Seed Selection.

In the Variety Tests, twenty-one varieties were grown. The several varieties included the following types :—

Type 1 ..	{	Yellow Pryor	}	Yellow or Bright Varieties, for Flue-curing.
		Blue Pryor		
		Boyd 1269		
		Bullion		
		Hester		
Type 2 ..	{	Swazie	}	Yellow or Bright Varieties, for Air-curing.
		Flannagan		
		Swazie X Burley		
		Burley X Swazie		
Type 3 ..	{	Improved Clarksville	}	Heavy or Dark Varieties, for Air-curing or Open-fire Curing
		Boyd 1265		
		Genuine Pryor		
		Canter X Boyd		
Type 4 ..	{	Hanna's White Burley	}	For Light Red Leaf, for Air- curing.
		Broadleaf White Burley		
		White Burley 1272		
		Pabst's Stand-up Burley		
		Broadleaf Stand-up Burley		
Type 5 ..	{	Texas Cuban	}	For Cigar Filler, for Air-curing.
		Florida Cuban		
		Zimmer Spanish		

The varieties of types 1 and 2 were grown on turf soil, and the varieties of the other three types were planted on a sandy loam of medium fertility. The tobacco,

on the turf soil, was not irrigated after transplanting ; and although it suffered considerably from the drought, the yields were good, as can be seen by referring to Table 2.

The varieties on the sandy loam were irrigated three times after transplanting. This land had been planted to tobacco the previous season, and the soil had become infested with Eelworm or Nematode, which attacked this season's crop. The plants suffered so severely from the attack of this pest that the Cigar Filler and Burley varieties were scarcely worth harvesting. The heavy or dark varieties did not suffer so much from the attack of Nematode.

Of the flue-curing varieties "Yellow Pryor" gave the best yield, 1,535 lbs. per acre, and "Boyd 1269" came second with 1,448 lbs. per acre. However, the percentage of yellow leaf was not so high in "Boyd 1269" as in "Blue Pryor," which gave a yield of 1,384 lbs. per acre.

In the varieties of type 2, the best yields were made by "Burley X Swazie" and "Swazie X Burley," respectively. The former gave a yield of 1,464 lbs. per acre, and the latter 1,440 lbs. per acre. These two hybrids showed up well for the first generation, and bid fair to become useful varieties when properly fixed. The leaf is broader and finer than the leaf of "Swazie," but not so large as the leaf of "Burley." The leaf also stands up well from the stalk, as in "Swazie," but has the light-coloured midrib and silky texture of "Burley." The plant is hardy, and the leaves are close together on the stalk.

The best yields made in the dark varieties were recorded for "Canter X Boyd," 1,318 lbs. per acre, with "Boyd 1265" second with 1,063 lbs. per acre.

On account of the disastrous effect of Nematode, the yield of the Burley and Cigar Filler varieties were very poor, and indicate that these types are very susceptible to the attack of this pest.

Our results in flue-curing were again very successful. Seven barns were cured by this method, and each gave as good results as could be expected.

The results of the season just past also corroborated the results of previous years, in that our best yellow leaf was obtained from the tobacco grown on turf soil.

In order to determine whether or not tobacco can be successfully cured in the Transvaal by the Open-fire method, one curing was made by this process. The colour of the cured leaf was from dark to cherry red, which is the colour desired ; but the leaf was lacking in body and texture, which are the characteristic features of American tobacco of this type. If the tobacco is grown on fertile, heavily-manured soil, there is no doubt that this method of curing could be successfully carried out in the Transvaal ; but since the market for this class of tobacco is very limited in South Africa, it is doubtful if it would be a profitable method to use for supplying local trade. When the production of South African tobacco becomes greater than the local demand, there is little doubt that tobacco cured by open fires will realize better prices when exported than ordinary air-cured leaf.

The results of our work in air-curing can never be completed with only one type of barn to use. The only air-curing barn which we have is built of brick and roofed with asbestos. Our results have been fairly good with this barn, but the farmers say that a building so constructed is too expensive for them to erect. In order to make our results in air-curing complete, we should have a two-tier, six room corrugated iron barn, and a similar one with a thatched roof. We have many inquiries from growers as to which of these types of barns are best suited for curing bright tobacco. Since we have no reliable data from which to draw conclusions, we are not able to give them accurate information on this subject.

We gave much time and attention to seed selection during the past season, and saved about 70 lbs. of tobacco seed. We expected that this amount would be ample to meet all demands, but our supply was far short of sufficient to fill all orders. This speaks well for the Station, for in former years there has been only a small demand for the seed of the improved varieties of tobacco. This fact alone serves to show that the tobacco growers appreciate our work and value our results.

BUILDINGS.

During the year the following buildings were erected :—

Dwelling House,
Dipping Tank,
Flue Barn.

REVENUE.

The revenue collected during this period amounts to £531 18s. 9d.

TABLE I.
Cotton Variety Tests, 1911-1912.

	Character of Soil.	Date Planted.	Came Up.	No. times Cultivated.	No. times Hoed.	Formed Squares.	Began Flowering.	First Bolls opened.	No. of Plants per plot.		Average height of plants in inches.	Average number of Bolls per Plant.	No. of Bolls for 1 lb. of Seed Cotton.		No. of lbs. of Seed Cotton.		Yield per Acre of		Percentage of Lint.	No. of lbs. Lost in ginning.
									For perfect stand.	By actual Count.			As found.	Selected.	Per Plot.	Per Acre.	Lint.	Seed.		
Columbia	24/10/11	5/11/11	4	2	27/12/11	2/1/12	28/2/12	2,070	2,145	22	7	75	59	61	244	80	164	30.5	0
Floradora	"	"	"	"	"	"	"	"	2,145	22	8	79	59	45	180	56	124	32.14	0
Sunflower	"	"	"	"	"	"	"	"	2,354	22	9	92	74	76	304	88	212	34.5	4
Griffin No. 5	"	"	"	"	"	"	"	"	2,211	20	9	90	74	65	260	172	172	32.5	8
Black Ratler	"	"	"	"	"	"	"	"	2,310	22	9	93	74	51	204	60	136	34.0	8
Allan's Improved	"	"	"	"	"	"	"	"	2,013	28	9	94	60	56	224	60	160	37.3	4
Cook's Long Staple	"	"	"	"	"	"	"	"	2,112	26	9	100	72	37	148	44	104	33.6	0
Upland Short Staple	"	"	"	"	"	"	"	"	2,002	16	7	87	60	41	164	60	100	27.3	4
Layton	"	"	"	"	"	"	16/2/12	"	2,156	20	9	78	64	50	200	74	124	27.02	2
Toole No. 6	"	"	"	"	"	"	28/2/12	"	2,112	16	8	76	59	33	132	48	84	27.5	0
Peterkin	"	"	"	"	"	"	"	"	2,084	18	9	76	54	56	224	80	140	28.0	4
Doughty's Big Boll	25/10/11	7/11/11	"	"	"	"	"	"	2,048	15	7	96	74	23	92	32	60	28.5	0
Christopher	"	"	"	"	"	"	"	"	2,430	19	8	81	67	19	76	24	52	31.6	0
Cleveland	"	"	"	"	"	"	"	"	2,504	22	9	70	56	44	176	60	108	29.3	8
Herlong	"	"	"	"	"	"	"	"	1,872	24	9	63	51	68	272	88	172	30.9	12
Bancroft	"	"	"	"	"	"	"	"	2,244	21	9	60	50	65	260	84	168	30.9	8
Pullnot	"	"	"	"	"	"	"	"	2,264	25	13	53	45	63	252	80	164	31.5	8
Truitt's Big Boll	"	"	"	"	"	"	"	"	2,160	20	8	70	59	49	196	56	136	35.0	4
Russell's Big Boll	"	"	"	"	"	"	"	"	2,004	24	7	79	68	63	252	84	152	30.0	16
Bohemian	"	"	"	"	"	"	"	"	1,704	19	7	100	86	66	264	96	164	27.5	4
Nyasaland	"	"	"	"	"	"	"	1,880	730	27	11	98	87	41	196	62	118	31.5	18
West African	"	"	"	"	"	"	"	"	980	28	10	104	89	51	244	76	149	34.0	19
COMMERCIAL PLOT.											28	22	..	..	..	689	258	440	28.6	10
Christopher ..	(1)	14/11/11	22/11/11	4	2	15/1/12	20/1/12	14/3/12	12,420	..	26	24	..	..	..	813	293	485	33.4	25
Cleveland ..	(1)	"	"	"	"	"	"	"	"	..	"	"	"	"	"	"	"	"	"	"

(1) Grey, sand loam of medium fertility.]

TABLE II.
Tobacco Variety Tests, 1911-12.

Variety.	kind of Soil.	Transplanted.		No. times irrigated after transplanting.	No. times cultivated.	No. times hooded.	Began Topping.	Began harvesting.	Area of plots in acres.	No. of plants per acre.		Yield in pounds.	
		1st.	2nd.							For perfect stand.	Harvested.	Per Plot.	Per Acre.
Yellow Pryor..	..	26/9/11	20/10/11	None	4	1	19/1/12	26/2/12	1 1/2	9,450	9,170	2,303	1,535
Blue Pryor	27/9/11	24/10/11	"	"	"	"	19/2/12	1 1/2	3,150	2,805	692	1,384
Boyd 1269	28/8/11	"	"	"	"	"	"	1	3,150	2,880	724	1,448
Bullion	4/10/11	1/11/11	"	"	"	20/1/12	"	"	6,300	5,032	979	979
Hester	27/11/11	"	"	"	"	9/2/12	4/3/12	300 plants	300	283	32	1,024
Flannagan	"	"	"	"	"	"	"	1 1/2	1,575	1,112	193	772
Swazie	"	"	"	"	"	"	"	1 1/2	1,575	1,144	180	720
Swazie X Burley	"	"	"	"	"	"	"	300 plants	300	262	45	1,440
Burley X Swazie	"	"	"	"	"	"	"	300 plants	300	266	45 1/2	1,464
Canter X Boyd	20/11/11	4/12/11	Three	"	"	13/2/12	16/3/12	1 1/2	1,575	1,216	329 1/2	1,318
Genuine Pryor ..	Sandy loam	"	"	"	"	"	"	"	1 1/2	1,575	1,048	282 1/2	1,103
Improved Clarksville	"	"	"	"	"	"	"	1 1/2	1,575	848	262	1,048
Boyd 1265	"	"	"	"	"	22/1/12	"	1 1/2	1,575	904	265 1/2	1,063
Pabst's Standup Burley	12/11/11	28/11/11	"	"	"	"	27/2/12	1 1/2	1,575	359	18	72
Broadleaf Standup Burley	"	23/11/11	"	"	"	"	"	1 1/2	1,575	864	57	228
Broadleaf White Burley	13/11/11	28/11/11	"	"	"	"	"	1 1/2	1,575	364	24	95
White Burley 1272	"	"	"	"	"	"	28/2/12	1 1/2	1,575	920	58	232
Hanna's White Burley	14/11/11	"	"	"	"	"	"	1 1/2	1,575	468	41	164
Texas Cuban	9/10/11	23/10/11	"	"	"	18/1/12	21/2/12	1 1/2	1,575	920	56	224
Florida Cuban	10/10/11	"	"	"	"	"	"	1 1/2	1,575	898	50	200
Zimmer Spanish	11/11/11	"	"	"	"	"	"	1 1/2	1,575	1,162	230	920

APPENDIX B.

REPORT ON THE WESTERN PROVINCE, C.P., TURKISH
TOBACCO EXPERIMENTS.

By L. M. STELLA, Officer-in-Charge.

To the Chief of the Tobacco and Cotton Division, Pretoria.

Sir,

I have the honour to submit to you the following report on the work performed in the Western Province during the period 1st January, 1912, to 31st March, 1913.

INTRODUCTORY.

The Turkish Tobacco industry has made rapid progress in the Cape Province since its beginning, as will be seen not only by the increased number of experimenters and area under cultivation, compared with the previous year, but also in the improvement of the quality of the article produced. Growers are beginning to realize that tobacco is a paying crop and are taking great interest and pains to improve their methods of cultivation and curing in order to produce a first-class article.

The last Turkish Tobacco sale was unsatisfactory owing to the immatured condition of the tobacco, due to lack of better methods of preparing the leaf for market. The tobacco growers have recently formed a limited liability company and opened a warehouse at Paarl for the purpose of receiving, grading and maturing the tobacco. By this procedure, they hope to establish the industry on a sound basis.

EXPERIMENTS.

In 1911-12 Experiments with Turkish Tobacco were conducted on thirty farms, scattered in the Districts: Paarl, Stellenbosch and Tulbagh. The area under cultivation was 194½ acres. The approximate total area, including that of other tobacco growers, was 400 acres, and the total yield was 250,000 lbs. Of this amount about 230,000 lbs. were disposed of at the last Tobacco Sale, at an average price of 1s. 6½d. per lb. The previous year's average price was 2s. 1½d. per lb., a difference of 6½d. per lb. Forty thousand pounds of the total amount, 250,000 lbs., were primes and loose leaves, which, owing to their inferior quality, realized an average price of 3d. per lb. This partly accounts for the difference.

Below is a list showing names of experimenters, their addresses, area under cultivation, variety and quantity of seed supplied and manures applied per acre:—

Name.	Address.	Area.	Variety and quantity of seed supplied.	Manures applied per acre.
J. N. Swart & Co. ..	French Hock ..	6 acres	2 oz. Soulook	16 bags Karoo Ash. 4 bags Guano.
J. A. Swart Bros. ..	" ..	10 "	2 "	4 "
I. J. Coetzer ..	" ..	3 "	1 "	4 "
P. W. de Villiers ..	" ..	4 "	2 "	6 tons Karoo Manure.
H. Louw ..	Stellenbosch ..	8 "	4 "	Ash and Guano.
J. E. de Villers ..	" ..	12 "	3 "	Karoo Manure.
W. A. Krige ..	" ..	2 "	1 "	Fertilizers.
J. D. Krige ..	" ..	4 "	3 "	Karoo Manure.
F. J. Lambrecht ..	" ..	8 "	4 "	" "
J. G. Carinus ..	" ..	18 "	4 "	" "
C. W. Joubert ..	Wlottenberg ..	3 "	2 "	Fertilizers.
A. J. van Velden ..	" ..	2 "	1 "	Karoo Manure.
Louw Bros. ..	" ..	27 "	7 "	" "
Joubert Bros. ..	" ..	10 "	2 "	" "
R. Joubert ..	Lynedoch ..	4 "	2 "	Fertilisers.
D. H. Carinus ..	" ..	4 "	2 "	" "
P. G. Marais ..	Helderberg ..	10 "	4 "	" "
M. S. Krige ..	Bottelary ..	3 "	2 "	" "
D. Joubert ..	Wellington ..	2 "	1 "	Karoo Manure.
J. A. Joubert ..	" (Slang River)	16 "	4 "	" "
J. A. Joubert ..	" (Paarl Road)	4 "	4 "	" "
J. N. Louw ..	" ..	8 "	3 oz. Soulook 2 oz. Dubeck	" "
W. A. Malan ..	" ..	6 "	3½ oz Soulook	" "
J. A. Joubert ..	Paarl ..	8 "	4 "	" "
J. M. Richter ..	Tulbagh ..	1 "	1 oz. Dubeck 1 oz. Soulook	" "
E. van der Merwe ..	" ..	2 "	1½ "	" "
J. van Niekerk ..	" ..	2 "	1½ "	" "
A. B. Krigler ..	" ..	2 "	1¾ "	" "
E. J. Everard ..	" ..	3½ "	2½ "	" "
J. P. Viljoen ..	" ..	2 "	2 "	" "

Experiments with fertilizers, supplied by the Department gratis, were also conducted on two private farms. The following is a table showing number of plots, quantity of fertilizers applied, area under cultivation and yield :—

Messrs. Louw Bros., Vlottenberg.

No. of Plot.	Area.	Variety of seed.	Manures.	Yield.
No. 1 ..	$\frac{1}{2}$ acre ..	Soulook ..	3 tons Karoo Manure	320 lbs.
No. 2 ..	$\frac{1}{2}$ " ..	" ..	{ 144 lbs. Superphosphate 80 " Sulphate of Potash 60 " Nitrate of Soda }	304 "
No. 3 ..	$\frac{1}{2}$ " ..	" ..	{ 144 " Superphosphate 60 " Sulphate of Potash 60 " Nitrate of Soda }	276 "
No. 4 ..	$\frac{1}{2}$ " ..	" ..	{ 108 " Superphosphate 80 " Sulphate of Potash 60 " Nitrate of Soda }	348 "
No. 5 ..	$\frac{1}{2}$ " ..	" ..	{ 72 " Superphosphate 80 " Sulphate of Potash 60 " Nitrate of Soda }	263 "
No. 6 ..	$\frac{1}{2}$ " ..	" ..	{ 144 " Superphosphate 80 " Sulphate of Potash 120 " Nitrate of Soda }	266 "
No. 7 ..	$\frac{1}{2}$ " ..	" ..	{ 144 " Superphosphate 80 " Sulphate of Potash 90 " Nitrate of Soda }	268 "

Messrs. Joubert Bros., Vlottenberg.

No. of Plot.	Area.	Variety of seed.	Manures.	Yield.
No. 1 ..	$\frac{1}{2}$ acre ..	Soulook ..	3 tons Karoo Manure	310 lbs.
No. 2 ..	$\frac{1}{2}$ " ..	" ..	{ 144 lbs. Superphosphate 80 " Sulphate of Potash 60 " Nitrate of Soda }	284 "
No. 3 ..	$\frac{1}{2}$ " ..	" ..	{ 144 " Superphosphate 60 " Sulphate of Potash 60 " Nitrate of Soda }	260 "
No. 4 ..	$\frac{1}{2}$ " ..	" ..	{ 108 " Superphosphate 80 " Sulphate of Potash 60 " Nitrate of Soda }	324 "
No. 5 ..	$\frac{1}{2}$ " ..	" ..	{ 72 " Superphosphate 80 " Sulphate of Potash 60 " Nitrate of Soda }	250 "
No. 6 ..	$\frac{1}{2}$ " ..	" ..	{ 144 " Superphosphate 80 " Sulphate of Potash 120 " Nitrate of Soda }	256 "
No. 7 ..	$\frac{1}{2}$ " ..	" ..	{ 144 " Superphosphate 80 " Sulphate of Potash 90 " Nitrate of Soda }	264 "

The above experiments were a success, but meant a great deal of extra work for Messrs. Louw and Joubert. After experiencing many difficulties in carrying out these experiments, we conclude that the Government will have trouble in persuading other farmers to undertake this kind of work. An Experiment Station seems to be the only way to solve the problem. In my opinion, a piece of land about 50 morgen in extent, situated in a central place in the Stellenbosch District would be big enough for this purpose. We understand there are thousands of acres of Municipal lands very suitable for the culture of tobacco and other crops in this District.

The present system of carrying out experiments is not the proper one, and we strongly recommend that regular itinerant work be discontinued for several reasons. Our work is more in the nature of acting as foremen for the various farmers. We have practically never published any of our results—in fact they have been in such a disconnected nature that we would have found it difficult to record them. If we had an Experiment Station, as there are in the other Provinces, we could conduct experiments with fertilizers, crop rotation, seed selection, hybridizing, grading, sweating and baling tobacco. We would experiment with poisoned baits on insect pests, such as slugs, cut-worms, caterpillars and numerous other pests and fungi which in some seasons are very prevalent, often devastating entire crops. In addition, any young men who are interested in Tobacco culture could come to the Station and constantly be with us, and thereby obtain the best information.

We have also to consider the production of seed. At present we are dependent on a foreign country to furnish our tobacco seed. We are not attempting to do anything to improve these conditions. Another important factor is, that after a few years, the tobacco fields upon which we are growing tobacco at present will deteriorate to such an extent that they will be worthless as tobacco lands unless we find out what rotation of crops will maintain their fertility. This information can only be obtained by having a permanent station to conduct such experiments.

There is no doubt that we have done a lot of good in the Province and have made considerable progress, but we have long since passed the itinerant stage of the work. When we began this work we had only six farms, now we have forty-two. Besides this number we have been compelled to refuse an equal number through want of additional clerical and field assistance. Farmers, as a rule, are not disposed to conduct experiments, as they do not show direct profits. Farmers going in for tobacco for the first time frequently disregard the stipulation made by the Department in their letter of agreement, "That on no account is more than two acres to be put under cultivation the first year," and, instead of putting in only two acres, they often put in eight or ten and expect us to handle every pound of this crop. This is more than the Government can be expected to continue doing, and the sooner the Department alters its policy the better it will be. On the other hand, if the Department is disposed to continue along the present system then we respectfully recommend the addition to this staff of a typist and two additional field assistants. We would also require faster conveyance than the Cape cart and horses at present at our disposal.

The present system of trekking about the country at all hours of the day and night, through all kinds of inclement weather, is more than should be expected of an official. The work has developed to such an extent that if itinerant work is to be continued we will find it more expensive to the Government than to have a central station. Instead of going to every farmer in the District they could occasionally come to our station and see what we are doing, and then follow our lead. We would then only be required to go out of the District occasionally to look into any unusual difficulties that may arise.

Applications for conducting (so called) experiments with Turkish tobacco next season are already beginning to pour in, notwithstanding that this season's work has not yet terminated.

Experiments : Season 1912-13.

The following is a table showing name of experimenter, address, nature of soil, area under cultivation, variety of seed sown, and manures used :—

Name.	District.	Nature of Soil.	Area Acres.	Seed.	Manures.
J. E. de Vilhers ..	Stellenbosch ..	Reddish loam ..	16	Soulook & Dubeck	Karoo Manure.
Jameson & Heywood	" ..	" ..	10	Soulook ..	Fertilizers.
P. Havers ..	" ..	" ..	34	Soulook & Dubeck	Karoo Manure.
H. Louw ..	" ..	Reddish gravelly loam	14	Soulook ..	Ash & Guano.
W. A. Krige ..	" ..	Yellowish clay loam ..	4	"	Fertilizers.
S. B. Simons ..	" ..	Reddish loam ..	4	Dubeck	Ash & Guano.
P. Roux ..	" ..	" ..	2	"	"
P. de Waal ..	" ..	Sandy loam ..	2	"	"
Rousseau Bros. ..	" ..	Red sandy loam ..	6	Soulook	"
J. D. Krige ..	" ..	Chocolate loam ..	4	"	Karoo Manure.
P. G. Marais ..	" ..	Red sandy loam ..	16	"	Fertilizers.
Black & Faure ..	" ..	" ..	6	Soulook & Dubeck	Ash & Guano.
Gildenhuis ..	" ..	Grey decomposed Granite	2	Soulook	"
A. Voight ..	" ..	Yellow sandy loam ..	4	"	"
J. D. Krige ..	Bottelary ..	Yellow loam ..	4	Dubeck	Fertilizers.
M. S. Krige ..	" ..	" ..	10	Soulook	"
J. G. Carinus ..	Stellenbosch ..	Chocolate loam ..	20	"	Karoo Manure.
Louw Bros. ..	" ..	" ..	24	"	"
A. van Velden ..	" ..	" ..	6	"	"
Joubert Bros. ..	" ..	" ..	12	Soulook & Dubeck	"
C. W. Joubert ..	" ..	Sandy loam ..	6	Soulook	Ash & Guano.
R. Joubert ..	Lynedoch ..	" ..	6	"	"
D. H. Carinus ..	" ..	" ..	16	"	Fertilizers.
J. A. Joubert ..	Paarl ..	Clay gravelly loam ..	10	Soulook & Dubeck	Karoo Manure.
J. Hugo ..	" ..	Sandy gravelly loam	4	Soulook	"
P. J. Booysen ..	Wellington ..	Grey clayloam ..	4	Dubeck	"
J. Marais ..	" ..	Yellow clay loam ..	20	Soulook & Dubeck	"
W. Joubert, jnr. ..	" ..	" ..	10	Soulook	"
P. du Toit ..	" ..	Red loam ..	4	"	Ash & Guano.
D. J. Joubert ..	" ..	" ..	8	Soulook & Dubeck	Karoo Manure.
J. A. Joubert ..	" ..	" ..	14	Soulook & Dubeck	"
J. A. Joubert ..	" (Paarl Rd)	Red clay loam ..	4	Soulook	"
Sir David Graaff ..	Maitland ..	" ..	1	"	Fertilizers.
P. Theron ..	Tulbagh ..	Yellow sandy loam ..	4	"	Karoo Manure.
J. G. Everard ..	" ..	" ..	6	"	"
T. Winterbach ..	" ..	" ..	4	"	Ash & Guano.
E. van der Merwe ..	" ..	Yellow clay loam ..	4	Dubeck	Karoo Manure.
J. van Niekerk ..	" ..	Clay gravelly loam ..	4	Soulook	"
W. J. Basson ..	" ..	" ..	2	Dubeck	Ash & Guano.
J. M. Richter ..	" ..	" ..	2	Soulook	Karoo Manure.
P. D. du Toit ..	" ..	" ..	4	"	"
D. Conradie ..	" ..	Reddish loam ..	2	Dubeck	"

Karoo sheep manure was applied broadcast at the rate of 6 tons per acre ; ash and Government guano at the rate of 3,000 lbs. of ash and 800 lbs. of guano per acre ; fertilizers at the rate of 300 lbs. superphosphate, 160 lbs. sulphate of potash, and 140 lbs. nitrate of soda per acre was applied in drills.

It will be seen from the above statement, experiments with Turkish tobacco are being conducted at forty-two farms during the present year scattered in four Districts, viz., Cape, Stellenbosch, Paarl and Tulbagh. The area under cultivation comprises 311 acres. The approximate total area under cultivation, including other tobacco growers, is 525 acres, an increase of 125 acres as compared with last season's acreage. An estimated yield of more than 300,000 lbs. of tobacco was made early in the season ; but unfortunately, owing to the destruction caused by the unusual high winds, we fear the yield will not reach 250,000 pounds.

The above-mentioned figures will give an idea of the steady progress of the industry. This is gratifying when consideration is given to the difficulties with which we have had to contend.

A full report of this season's experiments will be submitted to your office in due course at the conclusion of the work.

STAFF.

My staff comprises one Assistant, whose duties are solely devoted to field work.

CORRESPONDENCE.

About 1,600 letters, 600 visiting cards, 40 telegrams and 15 monthly reports, besides other returns, were received or despatched.

A Bulletin dealing with the Cultivation of Turkish Tobacco in the Western Province has been written.

ITINERARY.

During the period under review we paid 600 official visits to the tobacco experimenters to demonstrate the sowing, manuring, planting and curing of their tobacco, and by special request we paid about thirty visits to other tobacco growers to advise them regarding the curing of their tobacco.

I accompanied two Deputations to the Minister for Agriculture in connection with the Tobacco Industry. In March I attended a Conference in Pretoria, and from there, in accordance with instructions, I paid a visit to the Tobacco Experiment Stations in the Transvaal Province.

I attended the tobacco sale in Cape Town, and remained about a fortnight, assisting in the disposal of about 150,000 lbs. of tobacco out of hand, owing to the unsatisfactory prices offered at the auction.

During the period under review I judged at four Agricultural Shows.

REVENUE.

This office sold 90 parcels of tobacco seed, realising a sum of £34 4s. 9d.

APPENDIX C.

REPORT OF THE BARBERTON EXPERIMENT STATION.

By W. B. WILSON, B.S.Agr., Officer-in-Charge.

To the Chief of the Tobacco and Cotton Division, Pretoria.

Sir,—

I have the honour to submit to you the following report on the work performed on this Station during the period 1st January, 1912, to the 31st March, 1913.

WEATHER.

The entire District suffered severely from drought during the year 1912. This Station was particularly unfortunate on account of its very limited irrigation facilities. A severe drought, during January and February, 1912, not only cut crops short, but made the veld very poor for winter grazing.

The rainfall for the period under review was as follows :—

Year.	Month.	No.	Inches.
1912	January	2	50
"	February	0	97
"	March	2	45
<hr/>			
5.92 inches in 3 months.			
<hr/>			
"	April	2	66
"	May	0	36
"	June .. ..	..	..
"	July .. ..	..	..
"	August .. ..	..	..
"	September .. ..	..	..
"	October	0	28
"	November	0	89
"	December	3	08
1913	January	3	97
"	February	6	35
"	March	4	78
<hr/>			
22.37 inches for 12 months.			

TOBACCO.

Variety Tests :

(a) Cigar Wrapper Varieties.

Sumatra (1258).
Sumatra (Sc.).
Shamel's Hybrid.

(b) Cigar Filler Varieties.

Florida Cuban.
Zimmer Spanish.
Halladay's Hybrid.

Of these varieties, "Sumatra (Sc.)" and "Sumatra (1258)" are the only ones worth recommending for the production of wrapper—"Sumatra (Sc.)" being preferable, as "Sumatra (1258)" is heavier and darker. "Halladay's Hybrid," although this is the first year it has been grown here, did very well indeed, and produced a small percentage of wrapper leaves. "Zimmer Spanish" has not done well, and "Florida Cuban" is a very light yielder without any especially good points.

(c) Light Air-curing Varieties (for Smoking Tobacco).

Sterling.
Clardy.
Yellow Pryor (1912).
Genuine Pryor (E. 888).
Tennessee Red (B.874).
Tennessee Red (B.10).

Of these "Sterling" gave the best results. "Clardy" and "Yellow Pryor (1912)" produced good light red tobacco and some bright (*i.e.*, yellow, mottled with red or green). "Genuine Pryor (E.888)" produced bright leaf when cured with artificial heat, but it did not produce as light red when air-cured as the "Sterling." "Tennessee Red (B.874)" also produced good bright tobacco with artificial heat.

(d) Heavy Varieties (for Snuff).

Macsvale.
Clarksville (C).
Clarksville (N).
Tennessee Red.

For this class of tobacco a very heavy, dark fatty leaf is required. "Macsvale" and "Clarksville (N)" gave best results. "Tennessee Red" and "Clarksville (C)" produced fair tobacco. The quality of the heavy varieties of tobacco produced in this District is good, and the area that is capable of producing it is large.

(e) Turkish Varieties (for Cigarettes).

Samsoum.
Isketché.

The two above-mentioned varieties were tried. They grew much too coarse and cured dark.

(f) Virginian Type (for Cigarettes).

Bright and yellow leaf cured in flue barns is what is usually understood to be the Virginian type of tobacco. We are not equipped with a flue-curing barn; but we have produced this season some very good bright leaf by air-curing, and also by modified air-curing (that is, heat supplied by small charcoal fires in an ordinary wood and iron building). The two varieties that produced the best bright leaf by air-curing were "Clardy" and "Yellow Pryor."

Besides these two varieties there developed from the "Tennessee Red" a strain (B 874) possessing many of the characteristics of excellent yellow tobacco. That it will flue-cure well may be inferred from the fact that some excellent yellow leaf was cured from it by the above-mentioned modified air-curing. It has every indication of being a good bright tobacco for the District; and farmers are more inclined to undertake to produce this than cigar tobacco.

"Genuine Pryor (E. 888)" also cured well with the aid of charcoal fires,

Experiments in the Production of Seedlings.—(a) Rate of sowing seed.—This experiment was conducted with “Shamel’s Hybrid” to determine at what rate per 1,000 square feet to sow seed to secure the largest number and best plants.

Four plots of prepared seed beds were measured and staked off, these contained $37\frac{1}{2}$ square feet each, and seed was sown as follows :—

Plot No.	Seed sown per plot.	Rate of space per 1 oz. seed.	No. good plants per plot.	No. fair plants per plot.	No. useless plants per plot.
1	1·48 oz.	1,800 sq. ft.	850	—	10 (d)
2	1·24 „	900 „	1,430	120	225 (b)
3	1·16 „	600 „	2,038 (a)	440	200
4	1·12 „	450 „	1,104 (a)	700	700 (c)

(a) Not quite as good as from Plots 1 and 2.

(b) Plants not evenly distributed over plot.

(c) Number estimated.

(d) Insect injured.

From this table one would infer that one ounce to 600 square feet is the most suitable rate to sow the seed ; but when it is considered that plants on Plot No. 2 were not so evenly distributed as those on other plots and that plants on plot 2 were a little better on the average than those from plots 3 and 4 the indication is that one ounce to 900 square feet will give better results than either of the other three rates.

(b) Methods of Protecting Young Seedlings.—Altogether four methods were employed, viz. :—Cheese-cloth cover, long grass, chaff (that is fine cut grass or forage stubble) and fresh stable manure. The cheese cloth gave best results from a standpoint of growth and had extra benefit for protecting plants against attack of insects. Long grass and chaff ranked about equal, but it was found necessary to raise the grass immediately the seed had germinated. Manure had the bad effect of carrying too many weed seeds. One difference in the cheese cloth and grass covering is that cheese cloth, at all times, is about 6 inches above the soil, and the grass is laid flat on the soil until germination takes place, which makes the soil more retentive of moisture and thus required less attention during the germinating period but more attention after that period.

Three-fourths of an acre of “Sumatra (Sc)” tobacco was transplanted in the open and an accurate record was taken of the cost of all work done on the plot. It was as follows :—

Preparation of Land	..	..	..	..	..	..	£0 17 10
Fertilizer	..	..	..	..	..	..	1 3 6
Applying Fertilizer	..	..	..	..	..	..	0 1 9
Seedlings (estimated at 2s. 6d. per 1,000)	..	..	..	..	..	..	0 15 0
Transplanting	..	..	..	..	..	..	0 19 2
Irrigating	..	..	..	..	..	..	1 16 4
Cultivating	..	..	..	..	..	..	0 12 8
Harvesting and housing	..	..	..	..	..	..	7 14 4
Bundling	..	..	..	..	..	..	0 12 6
Baling	..	..	..	..	..	..	0 5 0
Total cost producing $\frac{3}{4}$ acre	..	..	..	..	..	..	£14 18 1
Production $\frac{3}{4}$ acre 775 lbs., valued at 1s. 3d.	..	..	..	..	..	..	48 9 0
Net profit $\frac{3}{4}$ acre	..	..	..	..	..	..	33 10 11
or							
Net profit per acre	..	..	..	..	..	..	44 14 3

Assuming that the costs above enumerated would be the same for tobacco grown under cheese cloth shade, the cost of producing one acre of shade grown tobacco would be :—

Care of crop (as above)	..	..	..	..	..	..	£19 17 5
Tent material	35 8 7
Labour	5 18 8

Total cost of producing one acre under shade	£61 4 8
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A similar record to the one above was kept of the cost of producing $\frac{1}{2}$ acre of Sterling tobacco. It is as follows :—

Preparation of Land	0 12 0
Fertilizer	0 18 0
Fertilizing	0 1 3
Transplanting and filling vacancies	0 10 3
Seedlings (estimated at 2s. 6d. per 1,000)	0 7 6
Irrigating (not including that done at transplanting)	0 11 6
Cultivating	0 9 9
Topping and suckering	0 5 9
Harvesting and housing	0 5 6
Stripping	0 16 3
Baling (estimated)	0 3 9
Total cost production $\frac{1}{2}$ acre	£5 1 6
Cost per acre	10 3 0
Production per $\frac{1}{2}$ acre 680 lbs.	
Production per acre, 1,360 lbs.	
Value at 9d. per lb.	51 0 0
(Estimated value of crop is 2d. cheaper than average price received for last year's crop).	
Net profit	40 17 0

On account of the lateness of the spring rains it was impossible to properly prepare the land before the seedlings in the early beds were too large for use, as a result, the farmers succeeded in getting out only about two-thirds of a crop.

Many enquiries *re* tobacco growing have been answered and several trips made to the farms of some of the enquirers, with the result that six farmers in the District undertook to produce an experimental plot of cigar wrapper tobacco and others are very keenly interested in it, as well as the production of yellow leaf.

Nicotine Experiments.—Two beds, equal in size, were sown to Shamel's Hybrid and treated the same, except for the amount of water supplied to them. One bed was kept well saturated, while the other was given as little water as possible to keep the plants alive. Equal size plots were transplanted from these beds and treated throughout their growing period in the same manner as regards water, as they were in the seed beds. The object of this experiment was to determine if increased water supply, through the growing season, increased or decreased the nicotine content of the tobacco. The crop from these plots has been cured, but the amount of nicotine cannot be given as the analyses have not yet been made.

COTTON.

Our cotton experiments consisted of a variety test of eleven varieties of American Upland Cotton, one Egyptian type and one Nyasaland, which is probably a cross between Egyptian and American Upland. The results are shown in the following table :—

COTTON VARIETY TEST.

Variety.	Size of plot.	No. stalks per plot.		Average height of stalks.	Number bolls per stalk.	Number bolls per lb. seed cotton.	Yield per acre.	
		For perfect stand.	Actual.				seed. cotton.	Lint.
Nyasaland	$\frac{1}{2}$ acre	2,178	1,735	3' 2	34	90	588	173
Truitts Big Boll	"	"	1,757	2' 7	24	76	672	200·5
Griffins No. 5	"	"	1,709	3' 1	29	80	593	168·5
Columbia	"	"	1,948	2' 7	31	65	563	172
Christopher	"	"	2,033	2' 7	29	65	635	195·5
Pullnot	"	"	1,812	2' 6	36	63	704	197·5
Bancroft	"	"	1,857	2' 6	40	55	731	223
Bohemian	"	"	1,855	2' 9	40	79	657	205·5
Herlong	"	"	1,711	2' 10	39	64	759	220
Layton	"	"	1,577	2' 9	43	81	645	207·5
Russels Big Boll	"	"	1,430	2' 9	38	59	756	223·5
Toole No. 6	"	"	1,684	2' 10	48	73	740	235·5
Black Ratler (Egyptian Type)	$\frac{1}{2}$ "	"	1,947	3' 1	50	96	546	156·5

From the above table we selected "Herlong," "Russell's Big Boll" and "Toole No. 6" as the most suitable varieties for this District. Some of these are being tried this year by one or two farmers. For our tests during the season 1912-13 the most suitable varieties, as indicated above, have been selected for further trial and three new varieties which were imported from America. The varieties in this test are:—

Nyassaland.
Bancroft.
Truitt's Big Boll.
Christopher.
Herlong.
Toole's No. 6.
Russell's Big Boll.
Allans.
Sunflower.
Griffins.

The last three named are the newly imported varieties. All were planted on the 14th, 16th and 17th of January, 1913, on light, sandy loam, fertilized with 300 lbs. per acre of Government guano. To date the plants are 18 inches to 24 inches high and are flowering.

A small plot of Russell's Big Boll and Toole's No. 6 of 1911-12 crop were ratooned to try as a perennial. They fruited heavily but opened during rainy weather and the lint was damaged. Ratooning cannot be considered a profitable method with the upland varieties.

MEALIES.

The mealies reaped on the farm during 1912 amounted to 48 bags, an average of about 7 bags per acre.

SOY BEANS.

Chinese White Soybeans were tried, but were not a success. The growth was very poor. They were eaten down by hares and duikers and were also attacked by insects. Those that ripened burst and shattered out so readily that the pods had to be picked at once, this involved too much labour for their market value. The dry climate is probably the cause of the pods bursting so readily.

HOPS.

A few roots of this plant were received in February, 1913, from the South African Breweries, and have been planted. They have started to grow nicely but the results will have to be published later.

FERTILIZER AND ROTATION EXPERIMENTS

Mealies are planted in the rotation plots this year. In April, 1912, a very rank crop of Velvet Beans was ploughed under. The land was fallowed during the winter. In December, 1912, these plots were again ploughed. On the 13th and 14th January, 1913, they were planted to "Eureka" (yellow) mealies. The crop is not yet mature, and although it has been four years since the crops were fertilized a difference can be seen in the growth of the various plots—the "Complete Manure" and "Phosphate" plots are showing up about equal and better than all the others. No definite conclusions can be drawn until the mealies are harvested and weighed.

SUBSOILING WITH DYNAMITE.

Owing to so much being said at present about subsoiling land with dynamite, it was thought advisable to start an experiment to test its merits on different crops.

Two one-eighth acre plots were staked off side by side and one was subsoiled with dynamite and the other left for comparison. The two plots are in one corner of a general field, which was ploughed and planted to mealies (Hickory King). Next year the field will be in cotton and it is proposed to keep a comparative record of the yield of different crops from these plots for a number of years.

In addition to this, three naartjie trees were planted in dynamite holes. In the same orchard naartjes had been planted six months earlier in ordinary spade holes. This will give us an opportunity to compare the growth of fruit trees and all field crops on the subsoiled and unsubsoiled land.

FORESTRY PLOTS.

These plots are a great adjunct to the Station. As wind-breaks they are invaluable; and the poles received from the thinning out of the plots have been useful in curing this year's tobacco crop. The trees are mostly gums, and those that are doing best are "Eucalyptus Saligna," planted on low, comparatively moist land; "Eucalyptus Creba" and "Eucalyptus Paniculata" on the higher and drier lands. The other gums grown are:—"Eucalyptus Eugenoides," "Eucalyptus Botyroides," "Eucalyptus Capitellata," and "Eucalyptus Citriodora."

"Pinus Kasya" (Pine), 35 % of which died during the winter drought. "Dalbergia Sissoo" (Teak) grows very scraggily; and the "Grevillea Robusta" (Silky Oak) is doing well; "Cedrela Odorata" and "C. Pevna" (Cigar Box Cedar) make very pretty avenues and are also valuable timber.

REVENUE.

The revenue collected amounts to £36 12s. 9d.

APPENDIX D.

REPORT OF THE PIET RETIEF EXPERIMENT STATION.

By R. T. FALGATE, Officer-in-Charge.

To the Chief of the Tobacco and Cotton Division, Pretoria.

Sir,

I have the honour to submit to you the following report on the work performed on this Station during the period 1st January, 1912, to the 31st March, 1913.

WEATHER.

A raingauge was erected on the 27th of May, and the rainfall recorded from that date was as follows:—

Year.	Month.	No. inches.
1912	May	·72
"	June	·20
"	July	·18
"	August	·06
"	September	·19
"	October	·65
"	November	3·26
"	December	7·59
1913	January	4·94
"	February	6·91
"	March	6·35
Total		31·05

The light misty rains that fell during the winter months, and also in October and November, were not sufficient to moisten the ground so that it could be ploughed. Ploughing throughout the district was only commenced during the first week of December. Ploughing and planting was kept up until well into January. As a result the crop harvested will probably be as large as usual.

The hailstorms throughout the district have been very severe and few farmers have not sustained loss in one way or another. The heaviest losses have been with the tobacco farmers ; in some cases everything was destroyed

CORRESPONDENCE.

Four hundred and sixty-seven letters, seven telegrams and twenty-nine way bills have been received during the year. Three hundred and twenty letters, sixty-seven issue vouchers, in triplicate, and seventeen telegrams have been despatched.

LIVE STOCK.

All of the live stock, consisting of 12 cattle, 8 mules and 2 mares with foals, have been in good condition throughout the year.

TOBACCO.

Seed Beds.—The seed beds were located on the top portion of the farm. They were well ploughed, prepared and sterilized. Forty beds were made. They were made three feet wide by twenty-one feet long, and were surrounded by a fence made of mealie stalks, which served as a wind-break and to keep the beds warm. The first beds were sown on the 17th of July, and were well germinated by the 2nd of August. These beds were covered with hessian, which accounts for the quick germination. Hessian is much closer woven and a thicker texture of material than cheese cloth, which is usually used. Hessian answers well for the first fortnight ; but we found after this time it had to be replaced with cheese cloth, as the young plants were becoming spindly and too tender. Hessian does not allow sufficient sun to the plants and water cannot drip through so evenly as with cheese cloth. All plants in the seed beds were very healthy. One third of a teaspoon of seed was used for each bed, and ten varieties of seed were sown, all of which did well.

SEEDING EXPERIMENT.

Seeding Experiment.—The experiments carried out in the seed beds gave some good results, as attached table will show.

Four beds were made, each 3 feet wide by 12 feet 6 inches long. This was to determine the right quantity of seed to be sown per bed or per square foot. The germination of the seeds was good throughout. Beds Nos. 1 and 2 had sturdier and healthier plants from the beginning ; Nos. 3 and 4 were very thick with plants, which were very much cramped. Towards the end of the experiment the last three beds became mildewed.

BEDS SOWN ON SEPTEMBER 4TH, 1912.

Bed. No.	Quantity of seed per bed.	1st Pulling. No. of plants.	Date.	2nd Pulling. No. of plants.	Date.	3rd Pulling. No. of plants.	Date.
1 ..	1.48 oz.	650	9/11/12	60	11/12/12	54	15/1/13
2 ...	1.24 ..	1,110	..	90	..	32	..
3 ..	1.16 ..	900	20/11/12	240	27/12/12	120	..
4 ..	1.12 ..	650	..	320	..	337	..

Bed No. 1 gave far the best plants. All of them were hardy and a good shape. When these were transplanted every one lived.

In bed No. 2 the first plants drawn were very spindly and, when transplanted, a great many died.

In bed No. 3, the first plants drawn were very spindly and watery and most of them died when transplanted.

The entire tobacco crop has been very badly damaged by hail.

[U.G. 47—'13.]

Six acres were planted as follows :—

$\frac{1}{2}$	acre	Herzegovina	October 22nd, 23rd, and 24th.
$\frac{1}{2}$	"	Tennessee Red	" " "
$\frac{1}{2}$	"	White Burley	" " "
$\frac{1}{2}$	"	Bullion	" " "
$\frac{1}{2}$	"	Improved Clarksville ..	October 25th and 26th.
$\frac{1}{2}$	"	Boyd 1265	" "
$\frac{1}{2}$	"	Shamels Hybrid	November 14th and 15th.
$\frac{1}{2}$	"	Sumatra	" " "
1	"	Yellow Pryor	" " "
$\frac{1}{4}$	"	Plot 1, Nicotine	December 30th and 31st.
$\frac{1}{4}$	"	Plot 2, "	" " "
$\frac{1}{4}$	"	Herzegovina	" " "
$\frac{1}{4}$	"	Tennessee Red	" " "

The crop grew splendidly and was looking well, but was badly damaged with hail on the 11th of December. The hailstorm only broke holes in the leaves ; but on December the 19th, a severe hailstorm ruined the crop.

The old plants were cut off and a new shoot came out, which made good growth ; but this was likewise badly damaged by hail on the 29th of January. The damaged leaves were removed and the remaining ones were harvested.

The crop is dark and of little value. The entire district suffered in the same way, many of the farmers experienced heavy losses, whole crops being completely ruined.

Nicotine Experiment.—This experiment was conducted for the purpose of determining whether tobacco grown on land that had been heavily watered throughout the growing period carried a greater or smaller percentage of nicotine than plants grown under dry conditions. This crop has been grown and harvested and will soon be sent to the chemist to make determinations of the nicotine content.

MAIZE.

This crop has done exceptionally well, considering the late planting season as the drought lasted until the first week in December. The hail did little damage, a few leaves were cut and torn about, but the cob was not damaged to any extent.

Thirty acres were planted on this Station, including the Experimental Rotation, crops, which came under mealies this year. The Rotation Plots are reported on elsewhere. The remaining part of the mealies are as follows :—

Twelve acres were planted using fertilizer, a mixture of 200 lbs. of Superphosphates (37 %) and 200 lbs. of Government Guano per acre. This crop has done exceptionally well and will give 12 bags per acre. This field was divided into four plots :—

4	acres	following	Cow Peas, which had been ploughed under.
4	"	"	Velvet Beans, which had been ploughed under.
2	"	"	Pea Nuts, after the nuts had been harvested the vines were ploughed under.
2	"	"	Barley, which had been harvested and the stubble ploughed under.

A vast difference can be seen where the different crops were grown the year previous. Where Mealies followed Cow Peas they are at present 10 feet high, and, in most instances, the stalks carry two well-developed cobs, and will easily give 10 bags per acre. Where Mealies followed Velvet Beans they are 9 feet high, but the cobs are not quite so well developed as those above. These, however, are also very good. Where Mealies followed Pea Nuts they are not so good, although during the last month they have progressed immensely and are 8 feet high, and will easily give 8 bags per acre. Where Mealies followed Barley they are poor and have been so from the start. They are only about 5 feet high and will give about 6 bags per acre.

The above crop was all planted within a week, and all of the plots were cultivated the same. The soil in which this crop is growing is the poorest on the farm. These results show what green manuring does.

COTTON.

One acre of each of the following varieties of Cotton was planted on November the 15th :—Nyasaland, Pullnot, Sunflower, Griffins and Allans.

The varieties Nyasaland and Pullnot germinated the best and had a perfect stand until they were destroyed by the hail in December. This crop was again planted, and it progressed favourably until hail badly damaged the plants, after this they could not recover sufficiently to give a crop.

LEGUMES.

During January Velvet Beans were planted in new veld soil. This crop is making a good growth and will be ploughed under as green manure.

Cow Peas were planted in January. They have made rapid growth, the roots are full of nitrogen bacteria nodules.

Soy Beans were planted in January. They made rapid growth and have already been harvested.

FERTILIZERS.

Most of the other experiments have been grown on superphosphates (37 %), 400 lbs. to the acre, and some good crops harvested. These plots were of great interest to the farmers, and many have visited the farm and are pleased with the results.

All the lands for the various crops were fertilized with phosphates. The results showed that phosphates are most needed for this soil.

On a four acre plot, planted with Mealies, 400 lbs. of phosphates per acre was broadcasted. Forty-five bags of Mealies were harvested from this entire plot, making an average of $11\frac{1}{4}$ bags per acre.

On a three acre plot 300 lbs. of phosphates per acre was broadcasted. This plot was also under mealies and 26 bags were harvested, showing an average of $8\frac{2}{3}$ bags per acre.

Both of the foregoing plots were new soil. These two experiments gave us a very good idea of the quantity of phosphates needed per acre.

A number of farmers have adopted this method and not only find that they get better results but that their soil is not so exhausted, and less fertilizer is required for the next crop.

FERTILIZER AND ROTATION EXPERIMENTS.

These experiments are carried out on a four year's crop rotation system. The attached diagram shows the amount and kind of fertilizers applied to each plot.

These plots were planted to Forage (Oats) on April 18th, 1911. The attached table gives the results.

It will be noticed that the unlimed portion of Plot 4 exceeds all other plots in weight, growth, etc., and the fertilizer on this plot costs less than any of the others, and that all of the plots where phosphates entered in the combination, are superior to the plots having no phosphates. The plots containing only potash and nitrogen are but little better than the check plots. Kraal manure gave very good results.

DISTRICT FERTILIZER AND ROTATION EXPERIMENTS.

When we agreed to supervise these Co-operative experiments a Committee from the Agricultural Society of Ward II. selected the plots to be used. Three have been selected and opened. They are being supervised by the Officer-in-Charge at Piet Retief.

These three experiments are located in different parts of Ward II. The purpose of these experiments is to ascertain what kind of fertilizer is most profitable to use and what crops can be produced in these parts with best results. The soils on the various plots are all of a different nature and quite different to those on the main Station.

One experiment is at Annyspruit, thirty miles from the Station in the direction of Wakkerstroom.

Another is at Bergen, forty miles from the main Station, in the direction of Lunenburg.

The third experiment is at Swaartwater, twenty-five miles from the Station, in the direction of Vryheid.

These experiments are laid out similar to the fertilizer and rotation experiments on the Station. The only difference is, that there is only $\frac{1}{4}$ acre in each plot.

This year, all the experiments, including those on the Station, are planted to Maize.

Fertilizers were applied on all the plots in the same proportions as those on the Station. (See Diagram.)

Annysspruit Plots.—The plots were prepared during October and November and planted with Maize.

They have been well cultivated and their relative growth is as follows :—

No. 8	Plot—Unlimed portion—1st.	Far in advance.
No. 9	„ „ „	2nd.
No. 9	„ Limed „	} Equal. Very good.
No. 4	„ Unlimed „	
No. 8	„ Limed „	
No. 7	„ Unlimed „	
No. 7	„ Limed „	} Equal. Fair.
No. 4	„ „ „	
No. 10	„ „ „	
No. 10	„ Unlimed „	
No. 11	„ Limed „	} Are all poor.
No. 6	„ „ „	
No. 6	„ Unlimed „	
No. 11	„ „ „	
No. 1	„ }	
No. 2	„ }	
No. 3	„ }	
No. 5	„ }	
No. 12	„ }	

It will be noted that the unlimed portions of the plots were in every case equal to or superior to the limed portions, which indicate that lime was not needed.

The crops have not yet been harvested.

Bergen Plots.—The plots were prepared and planted in December. In every instance the limed portion of the plot has made a better growth than the unlimed portion, and the crops where the fertilizers carry phosphates have made better growth than those carrying potash or nitrogen.

Their order of merit is as follows :—

No. 4	Plot—Limed—1st.
No. 8	„ „ 2nd.
No. 9	„ „ 3rd.
No. 11	„ „ }
No. 7	„ „ }
No. 6	„ „ }
	4th. Equal.

The unlimed portions are not so good. This portion of the District has had an enormous quantity of rain and the crop has not done so well, although the experiment is quite satisfactory. The plots have been well cultivated and will be harvested during May. The experiment is in a higher altitude than any of the others, and, consequently, the mealies were planted too late. This is the only place in this District where lime appears to be advantageous to crops the first year.

Swaartwater Plots.—These plots are not so good as the others owing to incessant rain. The lands have become waterlogged and the mealies were attacked by a disease, the tops dying off before they matured. The growth of the stalks is fair, but there will be only a few cobs to mature.

The best plots are Nos. 4, 9, 8, 10 and 7, unlimed portions.

Piet Retief Station Rotation Plots.—The mealies on these plots are good, considering that this is the fourth crop raised after the application of the fertilizers. They were planted on December 5th, 1912. It should be noted that a green manure crop (Velvet Beans) was ploughed under during the winter of 1912.

The phosphate plots are still leading.

No. 9	Plot—Unlimed Portion—1st.
No. 8	„ Limed „ 2nd.
No. 8	„ Unlimed „ 3rd.
No. 4	„ Unlimed „ 4th.

These four plots will give 10 bags per acre. There will be a crop from all plots, but the others are not so good. From all of these experiments one would conclude that lime is not needed for mealie growing.

SOILS.

Since last year's report a complete change of opinion has taken place in regard to the soils on this Station. Soils that were broken last year gave one the impression that nothing could be produced on them, and it was a general remark amongst the farmers that if crops could be raised on these soils of the Government Station they could be raised anywhere in this District. The crops this season have, however, grown splendidly, and have surpassed all expectations.

The cultivated lands, at present, have a depth of eight to twelve inches of loose friable soil.

There are four kinds of soils on this Station. The top lands, on the higher portion of the farm, have a brown clay loam soil 12 inches deep and a deep red clay subsoil. This soil gave fair results with phosphate fertilizers, but the plots where legumes had been ploughed under, as a green manuring crop, gave excellent results.

The vlel lands have six to eight inches of heavy black loam with oudeklip subsoil. These lands were very wet and boggy, but after having been well drained they produced excellent crops, especially when phosphates had been applied.

The semi-vlei lands have a depth of three feet of black alluvial loam underlain with several feet of oudeklip and clay. This soil, when treated with phosphates, gave the best results in all crops.

The portion set aside for orchard and trees has a surface soil very similar to the first mentioned, but it is underlain with a five inch layer of gravel.

BUILDINGS.

During the year the following buildings were erected :—

Dwelling House and Native Quarters.

Tobacco Air-Curing Shed.

Stable and Implement Shed.

Kraal for Cattle.

Dipping Tank and Kraals for Cattle.

REVENUE.

The revenue collected for the fifteen months amounts to £156 7s. 11d.

ROTATION EXPERIMENT PLOTS: FORAGE CROP: PLANTED 18/4/11.

Plot No.	Harvested.	Yield in Oat Hay.	Yield in Seed Oats.	Total estimated yield of Oat Hay per acre.	Total estimated yield of Oats (seed) per acre.	Estimated value of Oat Hay per acre. at 4s. 6d. per 100 lbs.
						£ s. d.
1. Limed ..	13/11/11	65 lbs.	Unfit	260 lbs.	..	0 11 8
1. Unlimed ..	"	65 "	"	260 "	..	0 11 8
2. Limed ..	"	70 "	"	320 "	..	0 14 5
2. Unlimed ..	"	65 "	"	260 "	..	0 11 8
3. Limed ..	"	110 "	"	440 "	..	0 19 9½
3. Unlimed ..	"	115 "	"	460 "	..	1 0 8
4. Limed ..	14/10/11	537 "	212 lbs.	2,148 "	848 lbs.	4 16 9
4. Unlimed ..	"	1,299 "	485 "	5,196 "	1,940 "	11 13 10
5. Limed ..	13/11/11	90 "	Unfit	360 "	..	0 16 2
5. Unlimed ..	"	110 "	"	440 "	..	0 19 9½
6. Limed ..	"	110 "	"	440 "	..	0 19 9½
6. Unlimed ..	"	115 "	"	460 "	..	1 0 8
7. Limed ..	14/10/11	1,080 "	434 lbs.	4,320 "	1,736 lbs.	9 14 3½
7. Unlimed ..	"	670 "	240 "	2,680 "	960 "	6 0 7
8. Limed ..	"	979 "	420 "	3,916 "	1,680 "	8 16 3½
8. Unlimed ..	"	955 "	410 "	3,820 "	1,640 "	8 11 10½
9. Limed ..	"	1,205 "	455 "	4,820 "	1,820 "	10 11 10½
9. Unlimed ..	"	835 "	300 "	3,340 "	1,200 "	7 10 3½
10. Limed ..	"	855 "	330 "	3,420 "	1,320 "	7 14 9½
10. Unlimed ..	"	745 "	300 "	2,980 "	1,200 "	6 14 1
11. Limed ..	13/11/11	170 "	Unfit	680 "	..	1 10 7
11. Unlimed ..	"	175 "	"	700 "	..	1 11 6
12. Limed ..	"	160 "	"	640 "	..	1 8 9½
12. Unlimed ..	"	160 "	"	640 "	..	1 8 9½

DIAGRAM OF FERTILIZED ROTATION EXPERIMENT PLOTS—PIET RETIEF.

		Limed Portion : $\frac{1}{4}$ acre.		Unlimed Portion : $\frac{1}{4}$ acre.	
Plot 1 ..	Lime, 250 lbs...	Nil ..	..	Nil ..	.. No Lime.
Plot 2 ..	Lime, 250 lbs...	Sulphate of Potash, 100 lbs.		Sulphate of Potash, 100 lbs. No Lime.	
Plot 3 ..	Lime, 250 lbs...	{ Nitrate of Soda, 80 lbs. Dried Blood, 100 lbs.		{ Nitrate of Soda 80 lbs. Dried Blood, 100 lbs. } No Lime.	
Plot 4 ..	Lime, 250 lbs...	Superphosphates, 160 lbs.		Superphosphates, 160 lbs. No Lime.	
Plot 5 ..	Lime, 250 lbs ..	Nil ..	..	Nil ..	.. No Lime
Plot 6 ..	Lime, 250 lbs...	{ Nitrate of Soda, 80 lbs. Dried Blood, 100 lbs. Sulphate of Potash, 100 lbs.		{ Nitrate of Soda, 80 lbs. Dried Blood, 100 lbs. Sulphate of Potash, 100 lbs. } No Lime.	
Plot 7 ..	Lime, 250 lbs...	{ Sulphate of Potash, 100 lbs. Superphosphates, 160 lbs.		{ Sulphate of Potash, 100 lbs. Superphosphates, 160 lbs. } No Lime.	
Plot 8 ..	Lime, 250 lbs...	{ Nitrate of Soda, 80 lbs. Dried Blood, 100 lbs. Superphosphates, 160 lbs.		{ Nitrate of Soda, 80 lbs. Dried Blood, 100 lbs. Superphosphates, 160 lbs. } No Lime.	
Plot 9 ..	Lime, 250 lbs. ..	{ Nitrate of Soda, 80 lbs. Dried Blood, 100 lbs. Sulphate of Potash 100 lbs. Superphosphates, 160 lbs.		{ Nitrate of Soda, 80 lbs. Dried Blood, 100 lbs. Sulphate of Potash, 100 lbs. Superphosphates. 160 lbs. } No Lime.	
Plot 10 ..	Lime, 250 lbs...	Kraal Manure, 10,000 lbs.		Kraal Manure. 10 000 lbs. No Lime.	
Plot 11 ..	Lime, 500 lbs...	—		— Lime, 500 lbs.	
Plot 12 ..	Lime, 250 lbs. ..	Nil ..	..	Nil ..	.. No Lime.

APPENDIX E.

REPORT ON THE TZANEEN EXPERIMENT STATION.

By E. H. T. POWELL, Officer-in-Charge.

To the Chief of the Tobacco and Cotton Division, Pretoria.

Sir,

I have the honour to submit to you the following report on the work performed on this Station during the period 1st January, 1912, to the 31st March, 1913.

In submitting this report it is necessary to point out that not having taken over the management of the Estate until the month of July, 1912, I am unable to report from personal knowledge, but from a report made by Mr. O. B. Chisholm, former Officer-in-Charge, to the Chief of the Tobacco and Cotton Division in April, 1912, I have extracted some data.

From July the work of this Station has followed the same general lines as heretofore, special attention being paid to the culture of Tobacco and Cotton. It has been necessary to grow certain crops, such as Maize and Oats for feeding both the natives employed and the work animals on the Estate.

Leguminous crops have also been grown to a large extent and turned under for the improvement of the soil. Pea Nuts were especially grown both for that purpose and as a source of income to the Estate.

Certain field experiments have been carried out in connection with Tobacco and Cotton, results of which are attached. Some of these experiments have not as yet been brought to a conclusion, therefore the final results will be given in the Annual Report, 1913-14.

BOTANICAL BRANCH.

A series of experiments have been undertaken by the Botanical Assistant in connection with Maize, Beans, Grasses, etc. A report on this work is appended.

HORTICULTURAL BRANCH.

The principal work of this branch has been to keep the new orchards well cultivated, sprayed, pruned and in good condition generally.

A quantity of Mangoes were consigned to the Johannesburg market, for which fair prices were realized.

STAFF.

Owing to the exceptionally trying summer experienced this year, especially during the months of January, February and March, there has been much sickness in the District. All my staff, with the exception of two, have been down with Malarial Fever.

WEATHER.

Rainfall Records.

			1908.	1909.	1910.	1911.	1912.	1913.
January	..	..	..	21·15	4·24	7·74	5·86	3·35
February	..	..	..	14·62	7·97	7·75	2·90	7·81
March	..	..	..	11·12	11·97	5·28	8·74	2·19
April	..	..	9·13	3·63	3·03	3·25	1·65	..
May	..	..		0·21	0·81	6·40	0·78	..
June	..	..		0·71	0·70	0·01	0·18	..
July	..	..		Nil	0·92	1·52	0·98	..
August	..	..		1·97	0·18	0·30	Nil	..
September	..	..	6·48	1·20	0·55	0·03	0·40	..
October	..	..		1·72	6·71	7·52	0·15	..
November	..	..		1·54	0·64	1·50	0·61	..
December	..	..	4·51	11·44	3·77	3·97	5·99	..
			20·12	69·31	41·49	45·27	28·24	13 5

Temperature.

			1911.		1912.		1913.	
			Max.	Min.	Max.	Min.	Max.	Min.
January	..	..	..	..	101·0	57·4	97·4	57·2
February	..	..	..	..	97·2	59·0	97·4	61·0
March	..	..	..	..	99·4	50·0	96·0	54·0
April	..	..	91·4	51·0	97·2	44·0	..	..
May	..	..	92·0	41·0	90·2	50·0	..	..
June	..	..	80·2	32·2	87·0	38·0	..	..
July	..	..	84·4	33·4	79·2	40·0	..	..
August	..	..	85·4	39·0	90·0	36·0	..	..
September	..	..	101·0	40·0	94·0	40·0	..	..
October	..	..	97·4	50·0	102·0	48·0	..	..
November	..	..	102·0	51·2	108·2	52·0	..	..
December	..	..	105·4	56·4	98·0	55·0	..	..

LIVE STOCK.

The trek oxen, cows and young stock have done well during the year.

The importation last June of a young Africander bull from Potchefstroom will help largely to improve the quality of the herd.

[U.G. 47—'13.]

The horses and mules have kept in good condition, with the exception of a few of the latter, which, owing to old age, are not fit for much hard work.

TOBACCO.

From Mr. Chisholm's report :—

“ The varieties and acreage planted were as follows :—

Broad Leaf Burley	3½ acres.
Yellow Pryor	8½ „
Samsoun (Turkish)	1¼ „
Herzegovina (Hungarian)	½ „
Boyd	½ „
R.C.T. Black Wrapper	—
Hybrid A	¾ „
Yellow Mammoth	¼ „
Texas Cuban	¼ „
Tzaneen Hybrids (3)	¼ „
Sumatra 1258 .. .. .	.. .. .
Florida Sumatra 1258-24-1	} 1 acre ¾ acre under Cheese cloth.
Skinner's Court Sumatra, 31-7-1	
Texas Sumatra	
Clarksville 1181/1. P. 1	⅛ acre.
Clarksville 1181/2. P. 2	⅛ „
Bright 258	⅛ „
Bright 259	⅛ „
Twist Bud 1244	⅛ „
Pabst Stand-up Burley 1254	⅛ „
Upper Cumberland 1243	⅛ „
Broad Leaf White Burley 1257	⅛ „
Brazilian 1259	⅛ „
(Name lost) 1246	⅛ „
White Burley 1272	⅛ „
Genuine Pryor 1253	⅛ „
Broad Leaf Stand-up Burley 1255	⅛ „
Wrapper Book 121	⅛ „
Zimmer Spanish	⅛ „

“ A few odd corners here and there were filled in with some of the above-mentioned varieties, making in all approximately 20 acres.

“ The cost of production on the Tobacco crop—up-to-date—is as follows :

Preparing lands, harrowing, transplanting, culti-	
vating, scoffling, etc.	£23 12 4
Manuring	8 11 10
Irrigating	2 5 6
Harvesting, stripping, etc.	24 13 11
	£59 3 7 ”

We started to harvest the 1911-12 tobacco crop during the month of January, 1912. The total crop from the 20 acres was sent to Pretoria, made up as follows :—

Cigar Wrapper Leaf	329 lbs.
Other Tobaccos	10,871 „
Total	11,200 „

For our 1912-13 crop we sowed our first seed beds in July, 1912, and continued sowing weekly until the middle of October, with a view of having a plentiful supply of plants.

A few thousand surplus plants were sold to various growers in the District.

Planting out, under irrigation, was commenced on September the 9th, and was continued regularly until the rain fell in December. By this time, some 20 acres of tobacco were planted out (under irrigation). Owing to the lack of moisture in the air and to the extreme heat of the sun, it was almost impossible for the tobacco to make any growth. Constant filling in was necessary and the crop from the

start seemed rather hopeless. However, after the first heavy rains, the tobacco commenced to grow rapidly.

On the whole, the season's crop promises to be satisfactory. It was fertilized with guano, and the effects of the manure no doubt added greatly to the heaviness of the crop.

Harvesting of the 1912-13 crop was commenced during the month of January, but as the crop is not all housed by the end of this financial year, the results will be given in next year's report.

Most of the tobacco is harvested by the leaf by leaf system. It is green sweated previously to being hung up and is curing a nice light colour.

The following varieties of tobacco have been planted out during the season :—

Yellow Pryor.
White Burley.
Broad Leaf Burley.
Sterling.
Boyd.
Joiner.
Herzegovina.
Sumatra.
Zimmer Spanish.
Florida Cuban.

Seed Experiments.—The purpose of this experiment was to determine the correct quantity of seeds per square yard, to give the strongest and healthiest plants. Four beds, $12\frac{1}{2}$ feet by 3 feet each, were prepared in the usual manner.

On bed No. 1, $\frac{1}{48}$ of an ounce of seed was sown; on bed No. 2, $\frac{1}{24}$ of an ounce; on bed No. 3, $\frac{1}{16}$ of an ounce; and on bed No. 4, $\frac{1}{12}$ of an ounce. The plants from bed No. 1 were best, yet the indications were that the seedlings were entirely too thick. On the other three beds, where the greatest quantity of seed was sown, the plants were the poorest.

Heavy versus Light Seed.—This experiment was carried out for the purpose of determining the relative weights of tobacco produced from heavy seed, compared to that produced from light seed. The tobacco seeds used in this experiment were separated into Heavy and Light seed by our "Tobacco Seed Separator." The two lots of seed were sown on separate beds and treated exactly in the same manner throughout the growing period—both in the seed beds and in the field. These experiments have been harvested. Next year's report will contain the results of the weights and the quality of the tobacco produced.

Nicotine Experiment.—The object of this experiment was to determine the difference of the amount of nicotine contained in tobacco of the same variety grown with as much, and with as little water as possible.

Two packets of "Yellow Pryor" seed were sown. Each packet was sown in a separate seed bed; these were marked Nos. 1 and 2. No. 1 seed bed was given as little water as possible, and No. 2 seed bed as much water as possible.

During the month of October two $\frac{1}{4}$ acre plots were planted, and numbered 1 and 2. No. 1 plot received just sufficient water to keep the plants alive, and No. 2 plot was watered every third day until the tobacco was well matured.

The tobacco from both plots is now being harvested. When it is cured it will be packed in separate bales and sent to Pretoria for analyses.

In connection with the experiment, it was noticed that the plants in No. 1 seed bed, which received as little water as possible, were far healthier and far larger than those of No. 2, which received as much water as possible.

MAIZE.

In preparation for the 1912-13 crop some twenty acres of maize were planted under irrigation during the latter part of August. This crop has now been harvested, showing a return of 82 bags. One hundred and thirty acres of maize have been planted, most of it being planted during the month of January. Notwithstanding the peculiar weather conditions of the season, a fairly good yield will be produced.

COTTON.

The cotton crop of 1911-12 did not mature as well as was expected. This was owing, no doubt, to want of sufficient rains during the early stages of growth.

Early frosts also had a bad effect on the latter plantings, and the Boll Worm did a very considerable amount of damage.

The total gross weight of the crop was 4,350 lbs.

Variety Tests—3-Acre Plots.

Plot No.	Variety.	Seed Cotton lbs.	Clean Lint lbs.	Stained Lint lbs.	Seed lbs.
1	Tooles No. 6	244	51	27	158
2	Christopher	200	46	12	133
3	Florodora	310	90	17	195
4	Griffins No. 5	224	49	17	153
5	Russells Big Boll	88	27	Nil	61
6	Nyasaland	63	17	Nil	46

Taken from Mr. Chisholm's report :—

“ The cost of production of the Cotton crop up-to-date is as under :—

Preparing lands, ploughing, harrowing, planting and cultivating,
scoffling, etc. £51 13 3.”

On the 3rd of September, 1912, four acres of Cotton (Cook's Long Staple) were planted out under irrigation. Most of the seed germinated in a week to ten days' time. The cotton was irrigated three times between the date of planting and commencement of rains in December.

From the first the cotton grew well. It is now laden with bolls and is so far practically free from insect pests.

The first picking was commenced during the month of March. The lint is clean and of good quality.

The early planting of cotton, under irrigation, has proved so far a success. A larger area will be planted under irrigation next season. The expense of irrigating is not great. The crop requires merely sufficient water to give it a good start and to keep it going until the advent of the rains which in an ordinary season should commence during October or November. The early maturing of the cotton may minimise the danger of attacks from certain insect pests. This will be determined later from the results of cotton planted at various dates.

Main Crop 1912-13.—The main crop of cotton, approximately 50 acres (Cook's Long Staple), was planted from the 6th to the 30th of December. Unfortunately, no rain fell during the month of January, so the cotton did not get the benefit of much rain in its early stages. The heavy rains of February brought it on wonderfully, but the crop on the whole is very patchy and a heavy yield is not expected.

Three varieties of imported seed—Sunflower, Griffin's Big Boll and Allan's Improved—were planted on the 3rd and 4th of January. As they are on good soil they will probably do well.

Six acres of Egyptian cotton of the following varieties were planted on the 23rd of January :—

Abassi,
Sekelarides.
Yannavitch.

As it was planted late it will probably not give a big yield this year, but should make good early growth next season. The cotton is planted under the water furrow so it can be irrigated when necessary.

FERTILIZER ROTATION EXPERIMENTS.

Our four years' rotation experiment, commenced in 1909, is planted this year to mealies. The object of this fertilizer and rotation experiment is to determine which element of plant food, when added to the soil, will produce the most profitable crop and do the least harm to the soil. The results of this experiment will be published when the work is completed.

The following fertilizers were used on each $\frac{1}{2}$ acre plot in the four years' rotation experiments :—

Plot No.	1	Check.		
" "	2	Sulphate of Potash	200	lbs.
" "	3	{ Nitrate of Soda	160	"
" "		{ Dried Blood	200	"
" "	4	Acid Phosphate	320	"
" "	5	Check.		
" "	6	{ Sulphate of Potash	200	"
" "		{ Nitrate of Soda	160	"
" "		{ Dried Blood	200	"
" "	7	{ Acid Phosphate	320	"
" "		{ Sulphate of Potash	200	"
" "		{ Acid Phosphate	320	"
" "	8	{ Nitrate of Soda	160	"
" "		{ Dried Blood	200	"
" "		{ Sulphate of Potash	200	"
" "	9	{ Nitrate of Soda	160	"
" "		{ Dried Blood	200	"
" "		{ Acid Phosphate	320	"
" "	10	Kraal Manure	20,000	"
" "	11	Lime	1,000	"
" "	12	Check.		

One crop out of the four is to be a legume. The following represents the crop grown during the third year of the rotation :—

Plot No.	Yield $\frac{1}{2}$ acre Limed.	Yield $\frac{1}{2}$ acre Unlimed.	Crop Sown.
1	18 lbs.	35 lbs.	Pea Nuts.
2	37 "	43 "	"
3	135 "	167 "	Velvet Beans.
4	143 "	177 "	"
5	103 "	79 "	Pea Nuts.
6	132 "	83 "	"
7	183 "	211 "	"
8	203 "	175 "	"
9	233 "	205 "	"
10	222 "	170 "	"
11	144 "	200 "	"
12	147 "	149 "	"

PEA NUTS—GENERAL CROP.

The 1911-12 crop produced 19,486 lbs.

Owing to the lateness of the rains it was not possible to get sufficient land prepared in time to put in a large acreage for the 1912-13 crop. During the month of January fifteen acres were planted, which should give a good return.

SUGAR CANE EXPERIMENTS.

The sugar cane fields planted during the month of September, 1911, have received every attention during the year. They have been stripped and cultivated when necessary, and have received a liberal supply of water during the winter months. The cane has grown very satisfactorily and has been free from disease or pests.

The people in the District have manifested much interest in these experiments.

REVENUE.

The revenue collected during the period under review amounts to £451 6s. 9d.
[U.G. 47—'13.]

REPORT ON THE BOTANICAL WORK AT TZANEEN ESTATE.

MAIZE EXPERIMENTS.

Variety Tests.—Soil—Brown loam, very deep. No manure applied to maize. Irrigation—None. Cultivated and hoed.

Section A.—Planted on the 30th of November, 1911. One-tenth acre plots.

Variety.	Quantity.	Germinated.	Height.	Harvested.	Yield per plot.	Yield per acre.
1. Natal White Horse Tooth ..	1½ lbs.	7/12/11	9 ft.	12/4/12	106 lbs.	1,060 lbs.
2. Boone County	1 "	"	9 "	9/4/12	99 "	990 "
3. Iowa Silver Mine	1 "	"	9 "	21/3/12	107 "	1,070 "
4. Sheeps Tooth	1 "	8/12/11	9 "	"	70 "	700 "
5. Natal Yellow Horse Tooth	1 "	"	9 "	10/4/12	114 "	1,140 "
6. Golden Beauty	1 "	"	9 "	21/3/12	90 "	900 "
7. Eureka	1 "	"	9 "	"	127 "	1,270 "
8. German Yellow	1 "	"	9 "	10/4/12	129 "	1,290 "
9. Yellow Hogan	1 "	"	9 "	"	77 "	770 "
10. Chester County Mammoth	1 "	"	9 "	21/3/12	59 "	590 "
11. Will's Gehu	1 "	"	4 "	20/2/12	10 "	100 "
12. Argentine	1 "	"	7 "	29/4/12	55 "	550 "

Bulk Tests.—Section B.—Planted on the 9th, 11th and 12th of November, 1912. One acre plots.

13. Bosses Hickory King ..	20 lbs.	14/12/11	6½ ft.	9/4/12	390 lbs.	390 lbs.
14. Mercer's Maize	18 "	16/12/11	7 "	12/4/12	253 "	253 "
15. Reed's Yellow Dent ..	16 "	18/12/11	6 "	26/3/12	687 "	687 "
16. Will's Dakota	16 "	18/12/11	4 "	28/2/12	162 "	162 "

Three rows of each variety in Section A were planted out by hand 3½ ft. apart. In Section B the seed was planted by machine. All varieties received the same treatment with regard to cultivation, and the soil was the same in all cases. The amount of seed was more or less the same. All extra plants were cut off in their early stages of growth.

It was impossible to get an even stand all over. In comparing the yield one should not lose sight of the following facts: A very dry season was experienced in November and the early part of December; Cut-warms and Rooibloem did considerable damage, so the yields must be considered as fair in some cases and in other cases good. A few varieties, early maturing, such as Will's Dakota and Will's Gehu are very small and were partially destroyed by guinea fowl.

Reed's Yellow Dent, Chester County Mammoth, Eureka and Iowa Silver Mine seem to be amongst the earliest maturing and the best yielders. Both Hickory King and Mercer's Maize should show better results if grown under favourable conditions. Natal White Horsetooth, Natal Yellow Horsetooth and German Yellow are late but good yielders.

These are the results of our first year's experiments but are subject to alteration after a few years' tests.

Variety Tests.—The following varieties were planted from the 16th to the 19th December, 1912—Quarter acre plots:—

A. Local Graded Seed.

1. Iowa Silver Mine.
2. Boone County.
3. Sheeps Tooth.
4. Natal Yellow Horsetooth.
5. Reid's Yellow Dent.
6. German Yellow.
7. Yellow Hogan.
8. Chester County Mammoth.
9. Golden Beauty.
10. Will's Gehu.
11. Argentine.
12. Will's Dakota.

B. Fresh Seed from Potchefstroom.

1. Iowa Silver Mine.
2. Snow White Dent.
3. Potchefstroom Pearl.
4. Natal Yellow Horsetooth.
5. Reid's Yellow Dent.
6. German Yellow.
7. Eureka.
8. Chester County Mammoth.
9. Palins Corn Flake.
10. Will's Gehu.
11. Argentine.
12. Yellow Congo.
13. Natal White Horsetooth.
14. Snow Flake.
15. Mercers.

Half acre plots.

13. Natal White Horsetooth.

One acre plots—Planted on the 20th of December, 1912.

14. Mercers.
15. Bosses Hickory King.

SOY BEAN EXPERIMENTS.

Variety Tests.—Soil—Red loam, deep soil. No manure, not irrigated., Cultivated and hoed.

Section A.—Planted on the 13th of November, 1911. Rows 2 ft. apart, seed 6 to 8 inches apart. One-fourth acre plots.

Variety.	Quantity.	Germinated.	Height.	Harvested.	Yield per plot.	Yield per acre.
1. Southern or Natal ..	6 lbs.	21/11/11	12 ft.	21/2/12	63 lbs.	252 lbs.
2. Sakura	4 „	„	8 „	20/2/12	40 „	160 „
3. Local Seed	5 „	22/11/11	2 „	7/3/12	84 „	336 „

Section B.—Planted on the 16th to the 18th November, 1911. Rows 18 inches apart. Seed 4 to 6 inches apart. One-eighth acre plots.

1. Southern or Natal ..	5 lbs.	27/11/11	12 ft.	21/2/12	27 lbs.	216 lbs.
2. Sakura	6 „	„	8 „	„	40 „	320 „
3. Local Seed	4 „	„	2 in.	7/3/12	32 „	256 „

Section C.—Planted on the 16th and 17th of November, 1911. Rows 12 inches apart. Seed 4 to 6 inches apart. One-eighth acre plots.

1. Southern or Natal ..	7 lbs.	27/11/11	12 in.	21/2/12	43 lbs.	344 lbs.
2. Local Seed	6 „	„	2 ft.	7/3/12	60 „	480 „

The three sections show three varieties of seed, sown at different distances. They received similar treatment in all cases. The quantity of seed differed slightly. It will be noted that the local seed grew the highest and matured later, and in sections A and C it shows the best yield. The Sakura variety could not be filled in again on account of shortness of seed, consequently it did not show such a good stand as the other varieties, and gave a poor yield. In Section B, the Sakura shows the best yield. It is clear that Section C shows the best yields throughout. There was no Sakura seed to put in plot under Section C.

COW PEA EXPERIMENTS.

Variety Tests.—Soil—Red loam, deep soil. No manure, no irrigation. Cultivated and hoed.

Section A.—Planted on the 14th of November, 1911. Rows 2 feet apart. Seed 6 to 8 inches apart. One-fourth acre plots.

Variety.	Quantity.	Germinated.	Height.	Harvested.	Yield per plot.	Yield per acre.
1. Local Seed	6 lbs.	21/11/11	1½-2½ ft.	19/2/12	109 lbs.	436 lbs.
2. Imported	6 „	„	1-2½ „	„	74 „	296 „

Section B.—Planted on the 16th and 17th November, 1911. Broadcast sown. One-quarter acre plots.

1. Local Seed	22 lbs.	23/11/11	1½-2½ ft.	19/2/12	117 lbs.	469 lbs.
2. Imported	27 „	„	1-2½ „	„	84 „	336 „

Section A, planted by hand. Section B, harrowed in.

The peas were sown about the same time and have grown under almost similar conditions. The seed grown in Section A is about one-third of that sown in Section B. To equalize, the peas in Section B were thinned out considerably and peas were filled in in Section A where the germination was not good. The local seed has given the best results in both sections, but as for rows *versus* broadcast, the latter has given a better yield. The rows probably were not near enough to each other and the plants had too much room to spread. The Cow Peas in Section A have spread much more than in Section B. Pods of the first measured 7 inches in length, the latter 5 inches.

The plants were not much affected by the insects eating the leaves.

VELVET BEAN EXPERIMENTS.

Variety Tests.—Soil—Red loam, deep soil. No manure. Not irrigated. Cultivated and hoed.

Variety.	Quantity.	Germinated.	Height.	Harvested.	Yield per plot.	Yield per acre.
1. Local Seed	18 lbs.	27/11/11	3-4 ft.	4/6/12	630 lbs.	2,520 lbs.
2. Local Seed	34 ..	..	2 3 ..	7/6/12	340 ..	1,360 ..

The first variety was planted in rows 2 feet apart on the 15th of November, 1911. The first was filled in. The latter germinated well. Double the quantity of seed was used in the second variety. They have been grown under similar conditions as far as possible. The rows show to be the better yield, taking into account the quantity of seed sown. The beans in the first variety showed more growth, hence the better yield.

RUBBER.

Variety Manihot from German East Africa. On December 6th, 1911, several hundred seeds were planted in a bed in rows about one foot apart, and the seeds four inches apart in the drill. They germinated about the 26th of December, 1911. Only five per cent. germinated. Some were from six to seven feet high. One of the trees flowered in May, 1912, but the flowers were killed by frost or a cold wind. The trees are quite healthy, excepting a few rusty spots on the leaves of one. The five trees were transplanted on the 19th of August, 1912, along with other Rubber trees, on the north side of the road leading to the main road to Letaba.

GRASSES.

The grasses were put in on the 12th of March, 1912, as follows :—

1. Burnet ¼ acre plot .. 40 lbs. to the acre.
2. Chewings Fescue " .. " .. "
3. Tall Fescue " .. " .. "
4. Mixed Pasture " .. " .. "
5. Paspalum 1 acre plot at the rate of 15 lbs. per acre.

No. 4, Mixed Pasture, contained the following varieties of grasses :—Tall Fescue, Chewings Fescue, Burnet, Philan Bulbosa, Lucerne, Cocksfoot, Fescue Grass, and Tall Oat Grass.

Of the grasses "Tall Fescue" germinated well and put on a few inches of growth until the drought killed it. Similar remarks apply to Lucerne. The other varieties showed no signs of germination.

APPENDIX F.

REPORT OF THE EAST LONDON EXPERIMENT STATION.

By D. D. BROWN, Officer-in-Charge.

To the Chief of the Tobacco and Cotton Division, Pretoria.

Sir,

I have the honour to submit to you the following report on the work performed on this Station.

Mr. Powell was stationed here until July, during which time he was preparing the lands for the cotton crop. I took over the Station on the 21st of October, and my report, therefore, will deal with the crop and the conditions from that time forward.

WEATHER.

The weather during this season has embraced the two extremes. The first part was very dry and strong winds prevailed; the latter part was very wet with no wind at all. The first heavy rain fell during the first week in December. The weather during January was favourable to plant growth, as it was both rainy and

dry during alternate intervals. February was a very wet month, copious rains having fallen, soaking the ground to such an extent that pools of water lay on the surface of sandy soil for days.

The rainfall was as follows :—

Year.	Month.	Days.	No. inches.
1912 ..	November .. ..	..	1·17
„ ..	December	16	4·65
1913 ..	January	11	2·56
„ ..	February	11	7·48
„ ..	March .. ..	..	..
		38	15·86

CORRESPONDENCE.

During the period under review approximately 88 letters and 6 telegrams were received, and 70 letters and 4 telegrams despatched.

COTTON.

The cotton crop on this Station was planted during the first half of November. It took the seed, on an average, six days to germinate. The plants when once established, grew rapidly, until they reached a height of four inches. They looked remarkably healthy until a cold, biting wind, which blew on the 24th of November, killed 50% of the crop. About this time a swarm of “Grasshoppers” started destroying the young plants. A treatment, consisting of arsenite of soda, sugar and water, was tried, with a view of exterminating this pest, but without any apparent success. After the crop had been destroyed by the wind and grasshoppers, the first shower of rain fell. This caused a second crop to spring up. It appears that one half of the seed came up while the other portion remained dormant until sufficient moisture was supplied to cause the seed to germinate. This shows how dry the soil was at the time of planting the cotton crop.

Across the middle of the plot there is a belt of drift sand, which, when blown along by the wind, destroys all plant life in its course.

The Sea Island cotton has done very well on the Fertilizer Plot. This variety has attained a height of five feet and is carrying a fair number of bolls.

Nyasaland and Abassi are also varieties which have done well.

The plants are being attacked by the “Sombre Twig Pruner.” The “Boll Worm” has also started operations and is destroying a large number of bolls. The plants are effected by the continuous rains we have experienced of late.

APPENDIX G.

REPORT ON THE TOBACCO WAREHOUSE, RUSTENBURG.

By T. E. ELGIN, Government Tobacco Warehouse Expert.

To the Chief of the Tobacco and Cotton Division, Pretoria.

Sir,

I have the honour to submit to you the following report on the work performed at the Warehouse during the period 1st January, 1912, to the 31st March, 1913.

WEATHER.

Early in January we experienced intense heat and drought. During the year there were many cool damp days, yet, as a whole, the year 1912 will be long remembered as one that was extremely dry and hot.

[U.G. 47—'13.]

DELIVERIES.

Some tobacco was delivered to the Rustenburg Co-operative Warehouse nearly every working day of the year. The largest receipts for one month were those of May, which amounted to more than 600,000 lbs.

The following tables show the percentages of the various grades received at the Warehouse in April, as compared to the receipts of July :—

Receipts for April.

" A " grade	$2\frac{3}{4}$ %	of the total.
" B " "	14.3 %	of the total.
" C " "	15 %	" " "
" D " "	39 %	" " "
" E " "	$9\frac{1}{2}$ %	" " "
" F " "	$4\frac{1}{4}$ %	" " "
" G " "	$12\frac{3}{4}$ %	" " "

Receipts for July.

" A " grade	$\frac{1}{3}$	of one per cent.
" B " "	4 %	of the total.
" C " "	10 %	" " "
" D " "	38 %	" " "
" E " "	15 %	" " "
" F " "	$8\frac{1}{2}$ %	" " "
" G " "	$22\frac{1}{2}$ %	" " "

Tobacco which hung all the winter in sheds and was delivered to the warehouse in January and February showed the following percentages of the light coloured grades :—

" A " grade	$1\frac{1}{2}$ %
" B " "	$10\frac{1}{2}$ %
" C " "	$19\frac{1}{2}$ %

It will be noticed that the per cent. of the two best grades was smaller in the January deliveries than in those of the previous April, but larger than those of the July deliveries. The largest per cent. of " Red " leaf was recorded in the January and February deliveries. This indicates that the tobacco left hanging in sheds through the winter undergoes a slight change in colour. There was less yellow but more red leaf in the very late deliveries than in those in April. There was more of the three grades of light coloured leaf in the January and February deliveries than in those of July. This indicates that some of the darker leaf becomes red while hanging in the sheds for several months. It is doubtful, however, if the gain made by the change in colour of the leaf, was equal to the loss sustained by damage from storms and shrinkage in weight while the tobacco hung for such a long time in the sheds. Had this same tobacco been delivered to a warehouse earlier in the season the improvement in quality, while in the stacks, might have been greater than that made while it was hanging in the sheds. Experience shows that tobacco improves very much in colour when it is properly fermented in stacks.

" De Magaliesberg Koöperatieve Tabakplanters Vereeniging " handled nearly $2\frac{1}{2}$ million pounds of tobacco during the year 1912. By careful receiving, fermenting, classing and selling this amount of leaf there was a net profit to the Society of more than £6,700 for the year.

ADVANTAGES OF CO-OPERATION.

The writer has made use of the opportunity to show farmers the advantages of co-operation, and has also advised them how to prepare tobacco for the market.

VISITORS.

Quite a number of visitors, most of whom were either directly or indirectly interested in tobacco growing, were shown through the warehouses, and given suggestions regarding the growing, handling and selling of the crop.

ITINERARY.

Short visits were made to several farms. By the request of the Co-operative Society of Rustenburg the writer made a trip to Rhodesia in January, 1912, and attended the sale of tobacco in Salisbury. It was interesting to see tobacco grown by Rhodesian farmers who had only had a little experience, sell much higher than that grown by Transvaal farmers who have been growing tobacco for many years. The reasons for this difference in value is explainable. Rhodesian tobacco has qualities that the Transvaal tobacco does not possess. The most important of these qualities seems to be colour and oil. How to give tobacco these qualities gives opportunity for experiments. While soil and climate may have considerable influence in the production of cigarette leaf, there is no doubt that proper handling of the crop is of very great importance in producing high grade tobacco. The greater part of Rhodesian tobacco is flue-cured, and then is nicely sorted and prepared for the market. A small amount of Transvaal tobacco compares very favourably with Rhodesian cigarette leaf.

During the year, a trip to Vredefort, in the Orange Free State, was made. A lecture on the subject of "Handling and Marketing Tobacco" was given, and the proper method of sorting was demonstrated. About seventy-five farmers were present. Some of them asked many questions and seemed anxious to learn a way to make tobacco growing more profitable.

A local manufacturer who is enterprising urged the farmers to follow the advice given by the Government Experts.

A few farmers along the Vaal River have installed pumping plants and are using water from the river for irrigation. The land is very fertile, and when properly watered and cultivated should produce enormous yields of tobacco or other crops.

DEMAND.

During the greater part of the year the demand for most grades of leaf was good. At times during the year 1912, and even during the first two months of 1913, it seemed that the supply of several grades of leaf was too great for the demand. The Government has been fortunate in opening negotiations with buyers from two oversea countries for the purchase of South African tobacco. Each of these buyers were put in communication with the Co-operative Society, and a few trial lots of tobacco have been sold in two over-sea countries. If South Africa should produce more tobacco than the local market demands, we hope that the farmers throughout the country will be organized so that they will be in a position to export large quantities of uniform grades, and in that way dispose of their surplus stock.

PROGRESS OF ORGANIZATION.

During the past year a great many members have been added to the Society. The Chairman of the Board of Directors recently spent a few days in the Pretoria and Krugersdorp Districts. As a result of this visit, 38 applications for membership have been received. This, with other observations, leads to the conclusion that farmers in other tobacco-growing Districts realize the value of an organization.

SUGGESTIONS FOR FUTURE WORK.

As it does not now seem necessary for the warehouseman to spend all of his time at the warehouse in Rustenburg, it may be well to consider whether or not it would be advisable to utilize his services for a part of the time in other Districts, or among farmers in this District.

The Chief Inspector of Agricultural Co-operative Societies and the writer made a trip to Piet Retief in January and attended a meeting of farmers. The object of this meeting was to organize a co-operative society, but after considering the conditions, it was decided that it would be better to wait one year before starting an organization at Piet Retief. Some of the more substantial farmers seemed to dislike the idea of taking the financial responsibility of a co-operative society. As they have now begun work in connection with the Rustenburg Society, perhaps they will in a short while, be convinced that there is but little danger of loss if the Society is successful in conducting their business. There is no doubt that both the Rustenburg and Piet Retief Districts will be in a better position to sell tobacco to a good advantage if it can all be under one management.

STATEMENT OF RECEIPTS AND EXPENDITURE FOR THE FINANCIAL YEAR, 1912-13.

TOBACCO AND COTTON EXPERIMENT STATIONS.

Receipts.	Rustenburg Exp. Stn.	Barberton Exp. Stn.	Piet Retief Exp. Stn.	Tzaneen Exp. Stn.	East London Exp. Stn.	Expenditure.	Rustenburg Exp. Stn.	Barberton Exp. Stn.	Piet Retief Exp. Stn.	Tzaneen Exp. Stn.	East London Exp. Stn.
Sales of Tobacco ..	£ s. d. 464 10 3	£ s. d. 32 15 9	£ s. d. 40 18 9	£ s. d. 317 1 8	£ s. d. ..	<i>Administrative Charges.</i>	£ s. d. 545 0 0	£ s. d. 358 12 2	£ s. d. 245 0 0	£ s. d. 261 6 10	£ s. d. ..
" Cotton ..	52 18 10	..	..	69 6 1	..	Salaries, Allowances ..	58 11 10	63 11 11	37 10 4	22 1 4	..
" Tobacco Seed ..	39 11 0	..	..	1 4 0	..	Transport & Travelling ..	..	..	..	..	..
" Cotton Seed ..	21 3 9	1 5 0	..	16 19 0	..	<i>Purchase of Stock.</i>	..	..	..	..	..
" Pea Nuts ..	..	..	50 2 8	84 8 8	..	Cattle ..	..	..	..	..	..
" Mealies ..	..	..	6 0 0	..	..	<i>General Maintenance.</i>	..	..	..	..	..
" Oats ..	..	..	23 10 0	..	..	Wages ..	692 10 8	456 3 0	447 11 9	1,196 18 4	216 15 9
" Fruit ..	6 13 9	2 12 6	29 10 0	10 16 5	..	Sundry Equipment ..	41 13 7	53 5 11	56 15 4	35 15 11	..
Miscellaneous ..	..	..	..	20 17 0	..	Sundry Stores ..	25 8 8	17 6 5	47 10 2	48 3 4	3 12 0
						Implements, Tools and Repairs ..	108 6 8	9 14 3	19 6 3	92 19 10	11 9 9
						Wagons, Harness and Repairs ..	88 9 1	17 6 2	26 3 3	72 10 8	..
						Feeding Stuffs ..	14 14 3	122 5 9	7 16 0	78 9 8	23 0 1
						Seeds ..	8 10 5	1 4 0	18 0 0	7 4 4	2 4 6
						Manures ..	19 17 6	29 18 0	58 11 0	41 9 11	15 8 0
						Fuel ..	62 9 4	1 4 0	6 7 6	..	..
						Ploughing ..	..	..	..	..	123 15 0
						Sundries ..	16 10 11	17 1 11	3 17 0	44 6 0	4 16 0
						Railage and Transport ..	75 14 4	14 7 7	14 5 0	79 13 3	3 16 5
						<i>Permanent Improvements.</i>	..	..	..	..	..
						Fencing Material ..	13 0 1	16 14 6	3 12 2	..	..
						Entertainments of Visitors ..	1 7 0	19 0 0	33 5 9	38 5 3	..
Total Revenue	£584 17 7	36 12 9	150 1 5	520 12 10	..	Total Expenditure ..	£1,772 4 4	£1,199 19 7	1,025 11 6	2,044 4 8	404 17 6

EXPERIMENTAL STATIONS—DIVISION OF TOBACCO & COTTON—STATEMENT *RE.*

Farm or Station.	No. of Draught Animals on Farm.	Other Live Stock	Average No. of Labourers employed	Total No. of Acres.	Total No. Acres Culti- vated.	No. of Experi- mental Plots laid out.
Experimental Cotton Station, East London.	1 horse	Nil	9	50	48	6
Experimental Station, Piet Retief ..	14 oxen 8 mules	Nil	16	290	233	28 acres
Tzaneen Estate	30	88	36	8,350	850	20
Experimental Station, Barberton ..	10 mules 1 horse	1	15	209	34½	26
Experimental Station, Rustenburg ..	15 oxen 14 mules 2 horses	1 cow 1 calf	20	300	110	17

APPENDIX X.

HORTICULTURAL DIVISION.

ANNUAL REPORT, 1ST JANUARY, 1912 to 31ST MARCH, 1913.

Department of Agriculture,
Pretoria.

The Secretary for Agriculture.

Sir,—

I have the honour to hand you herewith report on the Horticultural Division and its work during the period from 1st January, 1912, to 31st March, 1913.

Owing to the inevitable inclusion of the Experimental Orchards of this Division in the Agricultural Schools and Colleges at Potchefstroom and Elsenburg for Administrative purposes, reports from those stations will be submitted by the Horticulturists there to their respective Principals, this will also be the case at Cedara.

I have thought it well to include some reference to Horticultural subjects as outside the administrative scope of this Division, because all matters of a technical nature and those dealing with research in any particular branch should be made as far reaching and conclusive as possible, and derive their origin from the Chief of the Division, who alone is in a position to direct such work and collate the results. I have also been compelled to refer to the Horticultural staff as a whole, in order to point out what I consider the requirements of the Union to be in this direction.

STAFF.

The staff under my control is as follows:—Horticulturists at Citrus Experiment Station and Warm Baths, and at the Experimental Pome Fruit Station at Ermelo, a Temporary Fruit Inspector at Cape Town, an Instructor in Horticulture and Fruit Drying in the Cape Province who has, however, now been seconded to the Division of Viticulture, and one clerical assistant.

COLLEGE STAFFS.

These are composed as under:—Horticulturist at Potchefstroom, Elsenburg, Cedara and Glen, and in addition an assistant Horticulturist at Ermelo. There is a vacancy for a Horticulturist at Grootfontein. In each case the Horticulturist lectures on Horticultural subjects.

It will be seen that the total staff directly connected with matters Horticultural in the Union number at the present eleven members. I propose to sketch briefly the actual requirements of the Division from my standpoint.

Chief of the Division and clerical assistant, Horticulturists in charge Warm Baths and Ermelo, Government Fruit Inspector and Itinerant Instructor in Cape Province, and another for the Eastern Cape Province and Natal; the present number of Horticulturists at the schools should be retained, but should be reinforced by the appointment of a Horticulturist at Potchefstroom.

A total of thirteen, which distributed as shown could deal in a satisfactory manner, at any rate for the present, with the work of the country. The inclusion of an Assistant for the Eastern Province and Natal, would, I think, obviate the necessity of attaching a second man to the Colleges serving those areas. With a Horticulturist and competent assistant at Elsenburg, and the occasional itinerant services of the Government Fruit Inspector, an "Instructor" is no longer required. Were the proposal adopted the total cost, assuming salaries to remain on present grades, would be £4,359.

The charge to the country at present in the matter of salaries is £3,719.

Granting that the staff suggested is provided, it cannot be denied that it is an exceedingly small one; still it would be a long way in advance of present arrangements, and make for general efficiency.

WORK OF DIVISION.

During the period under review the staff directly responsible to this office has been engaged as follows:—The Instructor in Horticulture, Mr. Van Niekerk, has devoted his time almost entirely to missionary work amongst the Citrus growers of the Western Province (Cape); he has travelled from farm to farm, disseminating information on all matters connected not only with fruit and its culture, but also with raisin making.

He has also been of use in affording advice as to how best to combat insect pests and plant diseases, a function perhaps not strictly speaking falling to this Division, but one which all Horticulturists should on occasion be able to exercise. He has also more recently been assisting the Government Fruit Inspector (Cape Town), by collecting fruit direct from the farms for the experimental work done in connection with cold storage.

Mr. Bulmer, Fruit Inspector (temporary appointment), has been engaged, as the title of his office denotes, in the inspection of such export fruit, both Citrus and deciduous, as has been offered for the purpose.

As the season for export of Deciduous fruit from Cape Town opens in December, and closes in April (approximately), and that for Citrus lasts from May to October, it will be seen that his time is almost fully occupied with inspection work. This has been more particularly the case during the past season, as owing to the Fruit Export Regulations, formulated in November last, more growers have decided to have their fruit inspected.

Time not actually occupied by inspection has been devoted to travelling amongst the fruit growers in the South and Western portions of the Cape Province, and giving them advice on all matters connected with the export of fruit, such as time of packing, grading, wrapping, picking, etc. No one can possibly be as fitted for this particular purpose as the inspectors through whose hands most fruit exported must pass, they see all the faults, and can point out to growers how they should be remedied.

Mr. Bulmer has also been conducting experiments at the Harbour Cold Storage, Cape Town, with reference to the best temperatures at which to keep soft fruits in the cool chambers of the steamers in transit between Cape Town and Southampton. He furnishes a report (attached) on the subject.

The horticulturists at Ermelo and Warmbaths each send a report (appended), as to their work during the period under review. My own time has been more fully occupied than ever before. In addition to the usual office work and correspondence, which notwithstanding the availability of the college centres, shows little sign of diminishing. I have travelled over the greater part of South Africa with the exception of the Orange Free State, and held meetings (twenty-four in all), on matters connected with either fruit growing, or fruit export.

The neglect of the Orange Free State is more apparent than real, as Mr. Scott has always been available there. The fact remains that one man is not physically able to conduct an office in Pretoria and cover the whole of the Union of South Africa in a manner in the slightest degree satisfactory to anyone knowing its requirements, and it is for that reason that an Assistant for work in Natal and the Eastern and Central portions of the Cape Province is necessitated.

I propose to tour the greater part of the Orange Free State, where there are large apple interests, at the earliest possible opportunity. My contributions to the Union Agricultural Journal have not been as frequent as would have been the case had more opportunities been available. Judging at shows also takes a lot of time, and I acted in this capacity at Port Elizabeth, Grahamstown, Durban, Pretoria, Rustenburg, Nylstroom, Barberton, Maritzburg, Ladysmith, Pietersburg, besides attending Bloemfontein and other shows. I have only lectured at two; they were Kimberley and Grahamstown.

I notice at shows that many farmers will congregate to have the merits of an animal pointed out to them, and to criticise both animals and lecturer, but very few indeed will come to a lecture on fruit growing.

CORRESPONDENCE.

The number of letters dealt with approximately were:

Inwards	3,200
Outwards	4,550

The organization of the Division has now been outlined, and the work of my own section explained; it remains for some definite plan to be drawn up, detailing what work of a responsible nature or otherwise should be taken in hand during the coming year.

This can best be done at such a meeting of Horticulturists as suggested, but which has not yet taken place. The only item put forward by me for investigation during the year under review was in connection with Bitterpit in Apples.

Owing to drought of an almost unprecedented nature, nothing could be done in this connection, and that subject, in itself a large one, remains to be dealt with. Work is necessary and urgently so, in connection with Bitterpit in Apples; raising of all kinds of stocks in South Africa to avoid further risks of importing pests; better blight proof roots for apples; more suitable stocks for Citrus (Natal); and there are many other subjects of more or less importance to be dealt with later. Perhaps the next greatest urgency exists in dealing with the nomenclature of our fruits. This is a matter of great interest to the fruit growing public, and also to the nurserymen, and no action should be taken in this matter without thorough and competent representatives from each province being present.

FRUIT EXPORT REGULATIONS.

Owing to the completion of the new mail contract with the Union Castle Steamship Company, by which certain very considerable concessions were obtained for the fruit growers and exporters of South Africa, it became necessary to draw up regulations for the inspection of such fruit as shippers might desire to submit for that purpose.

Before speaking of these it may be perhaps as well to define what the concessions amounted to and their incidence.

1. A flat rate of 40s. per ton of 40 cubic feet, from any of the ports of export, Durban, Port Elizabeth or Cape Town, for all fresh fruit such as Peaches, Nectarines, Pears, Plums, Grapes, Apricots, and other soft fruits. The former minimum rate was 55s. in Cape Town, and 60s. in Durban. A proviso is included to the effect that the 40s. rate applies only to such fruit as has been inspected and passed, before shipment; but even for fruit not so inspected a rate of 50s. from either port is secured, thus affording a substantial reduction to any individuals who may not wish to have their fruit inspected.

2. The rate on Citrus fruit and Pineapples to be 25s. per cubic ton nett, in a chamber wherein the Steamship Company guarantees the temperature shall be kept between 38 and 50 deg. This rate applies only to such citrus fruits and pineapples as have been graded and passed by the inspector.

The previous rate was 25s. per cubic ton, and the space offered was the ventilated portion of the hold of the vessel. It is apparent therefore that a considerable reduction in the amount of freight has taken place, and that the accommodation secured for citrus fruits and pines is far superior to that previously in use.

That these reduced rates will exercise a most stimulating effect upon our export fruit industry goes without saying. A feature of the whole agreement with the Steamship Company is that although it desires to have all fruit graded and inspected, no one is compelled to submit to such inspection, and cheaper rates are granted in the case of soft fruits than were previously in existence. The regulations for the export of fruit, thus rendered necessary, were drawn up at a series of meetings held in Cape Town, Durban and Maritzburg; conjointly between members of the fruit growing community representing every Fruit Grower's and Fruit Exporter's Association; Horticultural Society; Farmer's Union, with whom it was possible to get into touch, together with many large private growers, and the Under Secretary for Agriculture, and myself representing the Agricultural Department. For such as desired their fruit to be inspected certain action became compulsory, especially with regard to application for inspection; uniformity of sizes of boxes; standardization of grades; precooling previous to shipment; marketing of boxes, etc.

Some exception has been taken to the fact that not one of the consignees was present; but whilst that is a perfectly just charge from one standpoint, the fact remains that local representatives of some of these firms attended the meetings in Cape Town and Durban, and I do not recollect any objection being raised by them to the decisions arrived at on those occasions. Further, any direct invitation sent to fruit dealers in England to attend such a meeting was out of the question, owing to lack of time. I am also of opinion that it was unnecessary, as the interests of our fruit farmers are well looked after by Mr. Chiappini, the Trades Commissioner in London, whose reports give the fullest possible information on every phase of the export trade in fruits, as seen from the importer's view point, who is in touch with consignees from time to time.

In addition, I had been in Europe and America the previous year, as had others who attended the Cape Town and Durban meetings, more or less recently.

and to my mind those present were perfectly competent to judge of their requirements.

Exception has been taken locally to the size of the Queen pines decided upon as a minimum for export. Growers both in Natal and the Cape want to send a pine weighing $1\frac{1}{4}$ lbs., and make that the minimum. There is no objection to that as far as I can see; it is only a pity when the matter was first decided on that the smaller size was not adopted.

Further exception has been taken by a local shipper to the size of the standard export orange box adopted. He wants it to be 24 x 12 x 12, whilst a firm in Southampton prefers 26 x 12 x 9, and wishes the marks applied differently.

Considering all things, I do not think that these regulations can be described as being anything but successful, and until some decided and very widely supported opinion is put forward to the contrary, I am of opinion that they will serve the purpose for which they were intended.

Not the least satisfactory feature is that from reports recently received from London, it has been shown that fruit so inspected, the boxes containing which bear the brand of the Government Inspector, have been sold for higher prices than fruit which has not passed the inspector. The far-seeing policy of the Government and the Shipping Company, in arranging for certain grading and inspection, whilst at the same time securing freight reductions, will naturally result in hugely increased shipments, and the innovation in time be regarded as responsible for the commencement of a new epoch in the fruit export business of South Africa.

FRUIT IMPORTED FROM OTHER COUNTRIES.

	1912.		1911.	
	Quantity.	Value.	Quantity.	Value.
	lbs.	£	lbs.	£
Almonds	233,968	13,052	248,878	12,995
Currants and Raisins.. ..	1,808,552	28,717	2,097,957	32,906
Dates	2,478,123	17,943	1,897,136	12,682
Figs, Dried	149,393	2,954	257,032	4,728
Prunes	9,471	276	33,721	926
Dried, Other	408,001	10,074	356,591	9,171
Walnuts	19,930	557	31,057	802
All others not mentioned ..	364,045	7,786	338,474	7,622
Bottled and Tinned	738,540	15,128	787,781	15,098
Pulp	56,053	942	98,496	1,264
Fruit, Fresh, Other .. ..	..	23,174	..	17,756
Fruit Juices and Cordials ..	..	19,552	..	15,176
Jams and Jellies	1,788,457	33,994	2,330,537	41,546

TOTAL IMPORTS OF FRUIT AND FRUIT PRODUCTS.

	1912.	1911.
	£	£
Almonds	13,052	12,995
Currants and Raisins	28,717	32,906
Dates	17,943	12,682
Figs	2,954	4,728
Prunes	276	926
Other Dried Fruits	10,074	9,171
Walnuts	557	802
All Other Nuts	7,786	7,622
Bottled and Tinned	15,128	15,098
Pulp	942	1,264
Fresh Fruit	23,174	17,756
Fruit Juice and Cordials	19,552	15,176
Jams and Jellies	33,994	41,546
	174,149	172,672

The foregoing totals show at a glance how much of fruit and its products the Union purchased from overseas in 1912 and up to March 31st of this year.

The total amounts are far larger than they should be, certainly than they will be if due progress is made in matters dealing with fruit growing, drying, and canning.

They are unsatisfactory also because they denote an increased import of certain lines which could and should be produced in this Sub-Continent.

Almonds, Currants, and Raisins, Figs, Prunes, all dried fruits and Walnuts can be grown in some parts of South Africa; whilst the culture of the Date should also be possible in a few suitable localities.

Certain allowances must be made for the imports of specialized commodities, such as Marmalades, French Bottled Prunes, Jams and Jellies of certain berry fruits, which do not succeed in South Africa, and also of pulp of the same varieties. There are brands of the above which are found, and will be found in all parts of the world. Even then there is room for great expansion of our jam and canning industries, before our own requirements are met.

Analysis of the import of fresh fruit shows that Canada and the Australian Commonwealth supply us with thousands of pounds worth of apples annually, the output is an increasing one in both instances. Canadian import is justifiable owing to the difference of seasons, but apples in Australia ripen approximately at the same time as our own, the inference is that South African fruit growers are backward. The fact is that fruit growing pure and simple as a means of livelihood is in the hands of too few individuals. Its possibilities are unrecognized, and as an industry it has never taken the place in South Africa to which it is entitled.

Difficulties also exist in dealing with the land question. The successful fruit growers of the world are not the largest land owners, more success is obtained in California by an individual owning 20 to 40 acres of orchard than by a company owning 500.

Orchards there are mostly small, averaging in the neighbourhood of 20 acres, and it is these small holdings cared for by intelligent fruit growers which have placed California in the position it holds to-day, as the premier fruit producing state in the United States of America.

Similar success is attained in like manner in Australia. Here in South Africa the small fruit growers as a class are practically non-existent.

If plots of land suitable for apples let us say were obtainable at reasonable cost, the first step would have been gained towards putting a stop to the importation of Australian or Tasmanian apples.

We get oranges and lemons from Spain and Italy during an "off season," this should soon be a business of the past. With improved facilities for storage it should be possible for South Africa to supply its needs in this line all through the year.

Reverting for a moment to the question of nuts of all kinds, one finds a total amount paid out of £21,395 for these in 1912. South Africa grows almonds and walnuts in quality equal to the product of any land, yet the market which evidently exists here is supplied from overseas, France and Spain doing the lion's share of the business.

One is compelled to ask, "Why should this thing be?" Again notice must be drawn to the dried fruit imports: prunes, peaches, pears, apricots, figs, and apples, are amongst the leading kinds of fruit which we cheerfully pay our friends in Australia and California high prices for. Yet the Western Province of the Cape could produce all we require. But it does not do so. Why is this? Not because the article produced there is not good; neither because conditions as to climate are not suitable. Yet the fact remains.

Raisins and currants, especially the former cost the country a lot of money annually, roughly speaking some £30,000 a year is sent over-sea for these articles, which the above named district might lay hands on if it would. The reason why it does not is more simple in this case.

Farmers do not look after their vines properly, do not plant them properly, dry the raisins or grade, process, or market them properly.

I speak of the bulk, there are of course exceptions.

There is no manner of doubt but that raisins of good quality can be grown in South Africa, and that if they were, imports would to a large extent cease.

Let us turn to a more hopeful subject, and that is:—

Export of South African fruit to other countries, as indicated in the following list, bearing in mind that no account is taken of fruit imported and re-exported.

It deals with the South African product only.

[U.G. 47—'13.]

FRUIT EXPORTED TO OTHER COUNTRIES.

	1912.		1911.	
	Quantity.	Value.	Quantity.	Value.
<i>Fruit Bottled and Tinned.</i>	lbs.	£	lbs.	£
United Kingdom	968	39	1,900	39
Belgian Congo	7,304	172	2,062	59
Germany	—	—	175	4
German South-West Africa ..	1,959	49	2,970	58
Holland	100	2	28	1
Portuguese East Africa.. ..	5,277	92	2,048	44
Portuguese West Africa	—	—	576	17
Ships' Stores	—	—	—	—
	15,614	354	9,759	222
<i>Currants, Raisins and Figs.</i>				
United Kingdom	15	1	45	2
Nyassaland Protectorate	—	—	96	3
Mauritius	369	10	—	—
Belgian Congo	251	6	325	9
Madagascar	—	—	6	—
German South-West Africa ..	2,968	65	3,590	89
Portuguese East Africa.. ..	250	4	280	7
Ships' Stores	687	15	1,072	22
	4,540	101	5,414	132
<i>Prunes.</i>				
Mauritius	282	8	—	—
Nyassaland Protectorate	—	—	192	6
Belgian Congo	1,552	43	2,409	70
German South-West Africa ..	519	14	1,065	36
Portuguese East Africa.. ..	—	—	1,463	38
Portuguese West Africa	—	—	265	8
Ships' Stores	210	7	213	7
	2,563	72	5,607	165
<i>All Other Dried.</i>				
United Kingdom	16,388	426	126,544	3,524
Ceylon	—	—	99	1
British East Africa	1,275	34	—	—
North-Eastern Rhodesia	—	—	50	2
Mauritius	674	13	—	—
Nyassaland Protectorate	—	—	288	11
India—Bengal	500	15	—	—
Belgian Congo	652	26	1,050	39
Germany	828	20	550	31
German East Africa	—	—	300	3
German South-West Africa ..	3,300	70	3,042	74
Holland	80	2	1,800	45
Portuguese East Africa.. ..	5,198	148	4,652	129
Ships' Stores	3,350	106	447	8
	32,245	860	138,822	3,867
<i>Nuts, Almonds.</i>				
United Kingdom	—	—	2,311	19
Mauritius	172	6	—	—
German South-West Africa ..	75	3	548	13
Portuguese East Africa.. ..	50	1	800	6
Belgian Congo	—	—	50	2
Ships' Stores	—	—	35	1
	297	10	3,744	41

	1912.		1911.	
	Quantity.	Value.	Quantity.	Value.
<i>Nuts, Other Kinds.</i>	lbs.	£	lbs.	£
United Kingdom	100	3	95	5
Mauritius	284	10	—	—
German South-West Africa ..	566	16	50	2
Portuguese East Africa ..	200	7	—	—
Belgian Congo	—	—	317	13
Madagascar	—	—	—	—
Ships' Stores	—	—	60	2
	1,150	36	522	22
<i>Fresh, All Kinds.</i>				
United Kingdom	—	45,334	—	36,169
Ascension	—	19	—	25
Mauritius	—	40	—	57
St. Helena	—	12	—	29
Zanzibar	—	11	—	—
Belgian Congo	—	181	—	26
Germany	—	47	—	275
German South-West Africa ..	—	2,141	—	3,293
France	—	—	—	1
Portugal	—	6	—	34
Portuguese East Africa ..	—	2,243	—	2,636
Holland	—	—	—	37
Russia	—	—	—	6
Portuguese West Africa ..	—	456	—	184
Ships' Stores	—	4,178	—	2,714
U.S.A.	—	—	—	1
	—	54,668	—	45,487
<i>Fruit Pulp.</i>				
United Kingdom	1,548	22	1,110	13
<i>Fruit Juices, Other.</i>				
Belgian Congo	—	28	—	10
German South-West Africa ..	—	7	—	65
Portuguese East Africa ..	—	41	—	28
Portuguese West Africa ..	—	—	—	—
	—	76	—	103
Apples Exported	—	1,041	—	1,353
Apricots	—	453	—	599
Bananas	—	566	—	427
Grapes	—	17,722	—	13,276
Naartjes	—	1,322	—	1,771
Nectarines	—	730	—	461
Oranges	—	6,345	—	5,764
Peaches	—	3,375	—	4,820
Pears	—	15,580	—	8,897
Pine Apples	—	1,244	—	826
Plums	—	4,587	—	5,197
Other Kinds	—	1,703	—	2,069

Analysing the above one finds some cause for hope, particularly with regard to export of citrus fruits. The export of these is the growth of a very short period. It commenced in 1906, and since then has attained a position of, with regard to oranges, third on the list of exported fruits.

It is only a question of a few years when the citrus fruit business will be the leading one of South Africa. With the improvement on varieties planted, in methods of handling and familiarity with the needs of the markets will come a widely extended demand.

Interest is more general in the citrus industry than in any other branch of fruit growing in South Africa. It is not confined to any particular area, as is the case with dried fruits, but can be carried on in the Transvaal, Natal, a large portion of the Cape Province, and a small part of the O.F.S. for that reason alone, the production of oranges is bound to be in the future, the prominent feature in the Fruit Industry of South Africa. Taking the grape as the most important fruit at present exported, one finds that whilst a good deal of satisfaction may be secured from the position of the business; yet there are also some unsatisfactory features.

Our grapes do not arrive at the over-sea markets in as good condition as they should; this is due sometimes to one cause and sometimes to another.

Climatic conditions influence the carrying qualities of this fruit more than any other.

Insufficient care in trimming of bunches causes low prices to prevail. Packing also has not yet reached the ideal stage; neither has the exact stage of ripeness yet been decided on at which the fruit should be picked. We are not singular in the latter respect, no final word has been said either in Australia or California. In fact those countries, like South Africa, are only in the experimental stage of the subject. As to packing, I intend with the co-operation of the Viticultural Division to carry out a series of experiments next season, which I hope will result in some improvement being made.

Pears, next in importance, are amongst our best fruits. They carry well, as a rule open up in good order, are splendidly packed, in fact this remark may be said to apply to all the fruit we export, with the exception of grapes.

Nectarines have in the past suffered from neglect as an export fruit; yet this is one of the most profitable to handle. Good carriers, of fine appearance and exquisite flavour. The Covent Garden market, to say nothing of other centres, has never yet been able to get enough of them.

Pine Apples.—Natal and the Eastern districts of the Cape produce excellent pines; export of them has not yet attained any considerable proportions, but it is only a question of time when this fruit will bulk largely on our export list.

Cayennes and Queens will prove as they have in the past the most acceptable kinds over-sea.

It must not be expected, at any rate for a long time, that we shall produce a Cayenne to equal those grown under glass in the Azores, but there is a good business to be done in ordinary class fruit, which can be produced in unlimited quantities in the Provinces named. The export from the Eastern district of the Cape for the present year was materially interfered with by a day or two of most abnormal heat at Christmas; consequently this year's output will show a shortage.

Of the other fruits mentioned on the list, Bananas and Apples and a few other items are sent mostly to German East and West Africa, to Portuguese East Africa and the Congo State. A few Mangoes have been sent to England and are likely with careful selection and packing, to find a larger demand than exists at present.

The Peach is perhaps the one fruit which we produce which is more appreciated in Europe than any other.

Its production for export purposes is confined almost entirely to the Western districts of the Cape and with satisfactory weather conditions it is a reliable carrier. Suitable varieties are gradually being evolved, but the ideal has yet to come. Meanwhile steady progress is being made with those which are available.

It is unlikely that any other portion of the Union will be able to export this fruit, and as the demand for it is very large, there is scope for further planting, on an extensive scale.

Plums.—Export of these is almost entirely confined to the Japanese and their hybrids. The domestic plum is not a success in South Africa as a rule, though there are a few spots where certain varieties do fairly well.

There is a steady demand in Europe for good plums. The varieties exported appear to be satisfactory, and they are being added to year by year. Blood Plums

of the Satsuma type are in good demand. Methley, Sultan and Apple, especially the latter, being the favourites.

With reduced shipping charges it is possible that a lower class of article may find a profitable market over-sea, but that is a question for experiment.

On the whole the export fruit business of South Africa is in a hopeful condition.

One or two matters (to be referred to later) when set right will be of material assistance in the development of this Industry.

It is somewhat singular that the present report comes at the period which embraces the seasons which show in 1912 the highest export figures, namely 4,096 tons and in 1913 the only instance when a large increase has not taken place on the export of the previous year. Figures for the latter year are 2,970, or slightly in excess of 1910 export.

Roughly speaking, an increase of 30 per cent. has taken place annually in the amount shipped, and now on the first occasion on which the reduced rates were offered and when everyone was expecting a record year, a shortage of over 1,000 tons on the previous year's shipments occurred.

Through the courtesy of the Union Castle S.S. Co., I am able to publish the actual number of packages of deciduous fruits exported during the last two seasons, so it is easy to see where the shortage occurs:

	1912.	1913.
	Packages.	Packages.
Grapes	91,942	72,438
Pears	98,045	58,992
Plums	40,694	44,232
Peaches	31,149	17,518
Nectarines	4,524	2,649
Apricots	3,569	1,780
Melons	585	184
Mangoes	542	77
Sundry	203	89
	<hr/> 271,253	<hr/> 197,959

The cause of the shortage has been traced directly to the climatic conditions which existed in the Western districts during blossoming time. Drizzling cold rain and bitter winds combined and alternated, accounting for a very large percentage of loss. As the figures above indicate, Peaches come in for more than their share of hard luck. It is satisfactory to know, however, as some kind of compensation that prices have been at their highest.

There are one or two features with regard to the past season which should be mentioned.

The first is the appearance of the Australian soft fruits and grapes in considerable quantities on the London market. Whilst it is not considered that the advent of Australian fruit or its shipment to England in large quantities will seriously interfere with our business from the Union; it cannot but be expected that during the close of the season when competition will probably be at its highest, there must be a tendency towards glutting the market, and consequent low prices.

Under such circumstances the obvious business procedure is to take steps to extend those markets as soon as possible. This work has been taken in hand by Mr. Chiappini, the Trades Commissioner in London, and in his customary enterprising manner he organized displays of South African fruit in European Capitals last season.

I do not propose to go further into that matter because Mr. Chiappini will be sending a full and complete report at an early date, but I am compelled to express my regret that he received so little support from some of the agents in England.

As you know, I secured promises from all the principal growers of their willingness to contribute a few boxes weekly. A total of over 100 boxes a week were offered, so that no blame can be thrown on the shoulders of our exporters. Some agents, however, appeared to wish to keep the whole business in England, and to get Continental buyers to go there to secure their supplies, and so fearing the opening up of business direct with the Continent, as a result of the Trade Commissioner's displays of our fruit, that officer was compelled on some occasions to purchase his exhibits; so scanty were the supplies offered.

The action of the agents in question appears to me to be singularly narrow, and not in accordance with the best interests of the fruit growers of South Africa.

Production of Dried Fruit (Cape).

The same causes which are responsible for a shortage in the export are answerable for a largely diminished out-put of dried fruits.

There is no doubt but that the summer of 1912-13 has seen less fruit dried than many previous seasons.

The Secretary to the South African Dried Fruit Co., one of the principal handlers of dried fruit in the Union states in answer to an inquiry, "The output of all varieties of dried fruit in this district has been very much below the normal. The quality of fruit might perhaps be considered slightly better than previous years, which may probably be accounted for by the fact that growers had so much less to dry. We think, however, that growers are certainly paying more attention to the drying of their fruit than hitherto, and this applies to raisins more than any other variety."

The one crumb of comfort here is that some improvement is apparent in quality.

There is an unlimited market for all our dried fruits; the supply comes from the Western districts of the Cape alone and extensive further plantings can be made annually, especially of Peaches and Prunes. The latter fruit does not appear to be at home in many of the orchards where I have seen the trees growing.

Growers should realize that the best possible soil obtainable and that of the deepest, is not any too good for this fruit. If soils are not up to the standard of fitness; very heavy fertilization should be resorted to and maintained year after year, in order to keep the land in good heart.

Supply of Our Home Markets.

In addition to the fruit exported oversea it must not be forgotten that our own markets are responsible for an enormous amount.

Formerly it was possible to arrive at a fairly correct estimate of the quantity shipped into the Transvaal from the other Provinces, but that is not now the case. I think it may be roughly stated that the amount sent to the largest market in South Africa, *i.e.*, Johannesburg, would realize from £100,000 to £120,000 during the past year.

Inter-Provincial business has so decided a trend northwards that as far as fruit is concerned, with the exception of Pines and Bananas from Natal and the Eastern portion of the Cape Province the volume of trade between other individual Provinces is hardly worth mentioning.

Refrigerator Cars.

In connection with the export of soft fruits, I should have perhaps adverted to the above subject. Californian experience goes to show that fruit precooled at the earliest possible moment after picking realizes the best price in distant markets. The same applies here, and by the use of refrigerator cars to receive the fruit at the larger stations on the railway, it is possible to pick it at a riper stage than one can do otherwise; this means that it arrives at its destination with a fuller flavour and better condition for immediate consumption than is acquirable under ordinary conditions, and that fruit so cooled fetches the highest figures.

Fruit picked at an earlier stage of ripeness also carries better under these conditions of precooling.

We have to thank the S.A.R. Authorities for having placed at the disposal of the fruit exporters a certain number of cars well fitted and suitable for the business.

Unfortunately, although these cars are built on sound lines and would answer admirably as refrigerators, it is up to the present impossible to use them as such, owing to the non-supplying of ice by the Railway Authorities. In other words we have refrigerator cars which don't refrigerate. It is quite hopeless to expect individual farmers to supply their own ice, and therefore it is to be hoped that before another season comes round arrangements may have been entered into which will admit of some more satisfactory methods being adopted.

With the spread of knowledge in matters connected with fruit culture, the suitability of certain districts for the production of certain fruits has become more fully recognized than formerly. There is plenty of land available for the culture of any kind of fruit; thus there does not at present exist any need for the extension of the zone inside of which any particular fruit can be produced. South Africa should for many years yet study to grow the right fruit in the right place, *i.e.*, the fruit which is best suited to soil and general climatic conditions.

As previously stated, the Citrus family has the widest range. Gradually the Apple is demonstrating its suitability for the High Veld in the Transvaal and the O.F.S., and also for the Cape Sea-board from Port Alfred to Mossel Bay.

Pines are at home in Natal and the South-Eastern portions of the Cape. It is these districts known to be suitable for the product of certain fruits that growers had best turn to for the production of that particular article.

In conclusion, I desire to thank those members of the Department who have assisted me at various times, particularly the officers of my staff, from whom I have received every possible help and the many members of the fruit-growing community of South Africa, who have afforded me both sympathy and encouragement on occasion.

I have the honour to be,

Sir,

Your obedient Servant,

R. A. DAVIS,

Chief, Division of Horticulture.

Enclosures.

Government Experimental Orchard,

Warm Baths,

4th April, 1913.

The Chief, Division of Horticulture,
Pretoria.

Dear Sir,

I have the honour to submit herewith a concise report of progress and work done on this Station for the year ended March 31st, 1913.

CLIMATIC CONDITIONS.

The season was quite the worst we have experienced since the Station was started. Only 15·53 inches fell during twelve months ended March 31st, 1913. We had three hailstorms, and although they only lasted for a few minutes; quite a lot of damage to fruit resulted.

The hot winds lasted from September to October. The rain this season fell in little showers (no set in rains at all), and in consequence there was very little water available for irrigation.

MANURING.

A crop of velvet bean was planted between the citrus trees in blocks 1, 2 and 3, but this did not grow at all well, and after being planted three months is hardly worth ploughing in, owing to the very light rainfall.

In December the following fertilisers were applied to different experimental plots, but we have not had sufficient rain to determine results yet.

Plot	1	Each tree received			7 lbs. Dried Blood.
"	2	"	"	"	7 lbs. Superphosphate.
"	3	"	"	"	7 lbs. Bonemeal.
"	4	"	"	"	No Manure.
"	5	"	"	"	3 lbs. Nitrate of Soda.
"	6	"	"	"	4 lbs. Superphosphate.
"	7	"	"	"	3 lbs. Sulphate of Potash.
"	8	"	"	"	3 lbs. Nitrate of Soda.
"	9	"	"	"	3 lbs. Superphosphate.
"	10	"	"	"	8 lbs. Basic Slag.
"	11	"	"	"	2 lbs. Sulphate of Potash.
"	12	"	"	"	4 lbs. Dried Blood.
"	13	"	"	"	4 lbs. Sulphate of Potash.
"	14	"	"	"	5 lbs. Superphosphate.
"	15	"	"	"	4 lbs. Bonemeal.
"	16	"	"	"	1 lb. Sulphate of Potash.
"	17	"	"	"	2 lbs. Nitrate of Soda.
"	18	"	"	"	1 lb. Potash.
"	19	"	"	"	3 lbs. Superphosphate.
"	20	"	"	"	6 lbs. Superphosphate.
"	21	"	"	"	8 lbs. Basic Slag.
"	22	"	"	"	2 lbs. Sulphate of Potash.
"	23	"	"	"	2 lbs. Nitrate of Soda.
"	24	"	"	"	2 lbs. Superphosphate.
"	25	"	"	"	1 lb. Potash.
"	26	"	"	"	3 lbs. Dried Blood.
"	27	"	"	"	2 lbs. Bonemeal.
"	28	"	"	"	4 lbs. Bonemeal.
"	29	"	"	"	3 lbs. Sulphate of Potash.

CULTIVATION.

All of the land was ploughed at least once, and then cultivated twice a month. Whenever the weeds grew too fast the disc harrow was put through. The soil near the trees was constantly worked with spade and hoe.

GENERAL NOTES ON THE FRUIT CROP.

The lemons were of better quality than in any previous season, and there was a good crop of oranges the fruit being in most cases first class. Naartjes bore heavily. With hardly an exception the deciduous fruit was very poor, owing to the drought and shallowness of our soil.

Citrus.

The trees have made no new growth at all; the better varieties bore nice fruit and most of the trees gave us fruit that was marketable.

The average revenue from trees ranging from 5 to 7 years being:—

Oranges.	Lemons.	Naartjes.
10s.	£1 8s. 6d.	18s.

An exhibit of citrus fruit was sent to the Natal Shows, and was very favourably commented upon by fruit Growers from all parts of the Union.

On account of the drought there will be a very light crop in 1913. Trees that carried 600 oranges in 1912, will only give us from 25 to 50 fruits.

The varieties I would recommend for planting are:—

Oranges.

Washington Navel, Valentia Late, Malta Blood, Pineapple, Homasassa, Brink, Excelsior.

Lemons.

Genoa, Eureka, Villa Franca, Belair.

Naartjes.

Beauty of Glen Retreat, Flat Mandarin, Californian.

Peaches.

As I have already mentioned this fruit was with very few exceptions very poor, and hardly worth picking. The trees suffered very much for want of water. The best varieties to grow in this District are:—Waldo, Angel, Jewel, Pallas, Florida Crawford, Brook.

A few of the new peaches from America carried a specimen fruit or two; these were all fairly large for early peaches, and are white fleshed clingstones, but as long as they are early and of good size will be marketable.

Plums.

The trees made very little growth, and the fruit was not up to quality of previous seasons. The best varieties are:—Climax, Sultan, Wickson, Shro, Satsuma, Burbank.

Apricots.

As with other fruits these did not do well. The following are suitable for this District:—Royal, Blenheim, Shipley's Blenheim, Tilton, and Flickenger's Best.

Nectarines.

Out of 12 varieties the Goldmine is the only one that has shown the least sign of bearing, and even this does not carry a full crop.

Olives.

The dry season has been favourable for this class of fruit. We have not been troubled nearly so much with Olive Bug. Most of the varieties bore good crops. Of the 16 varieties we have, the Oblitza has proved the best to date.

Apples.

Every season shows more plainly the unsuitability of this climate for apple growing for commercial purposes. It is possible to grow apples for home consumption if one is not too particular about quality.

Pears.

The Keiffer and like varieties bore a few fruits. Most of the trees of other varieties are too young to judge yet.

Almonds.

We gathered fruit from most of the varieties, but there was not a crop on any of them.

Chestnuts.

The Spanish chestnut bore a sprinkling of fruit of fair quality.

Persimmons.

The varieties that have done best with us are:—Tananachi, Among, Orange Seedless.

Grapes.

As with other fruits the drought affected these very much. Of the Texas grapes the following are the most suitable, and seem to be resistant to fungus diseases:—Wetumka, Niagara, Green Mountain, Carmen, Albania, Brilliant, McPike, and Calabrian.

INSECT PESTS AND FUNGUS DISEASES.

There was a little red scale on some of the citrus trees; these were fumigated, and as soon as convenient all of the remaining trees will be so treated. *Aspidiotus hederae* scale appeared again on one or two Olive trees; these will be fumigated as soon as the fruit is off.

The Apple and Pear trees will have to be treated with Lime Sulphur wash again next winter for greedy scale. Olive bug has not been quite so bad this season, but still it appeared often enough to necessitate spraying with McDougall's Dip at least once a month.

Fruit Fly was very much in evidence, but was kept well in hand with Arsenate of Lead spray.

Macrosporium disruptum.—A little of this fungus was noticed on a few lemon trees, but no damage was done to tree or fruit, owing to a spraying with Bordeaux mixture.

HYBRIDISING AND CROSSING.

No new work was undertaken in this direction this year; attention being given to the seedlings raised last season.

NURSERY WORK.

The only nursery work done has been just the raising of a few trees, etc., required for our own planting.

VISITORS.

We had a large number of interested visitors to the Station, who were given every facility to inspect the work being done, and assistance given to anyone at all interested in fruit growing.

PROGRESS OF THE FRUITGROWING INDUSTRY IN THE DISTRICT.

Citrus.

This branch of fruitgrowing is going ahead, and we are constantly getting enquiries from people who intend going in for growing oranges. In our immediate neighbourhood there is more need for improvement than expansion. Prospective orange growers come to this Station from other Districts for information and advice, and I think we have been able to convince most of them that there is money in the business. Although the progress with regard to other fruits is not so marked, yet a lot of trees have been planted during the past year.

I have the honour to be,

Sir,

Your obedient servant,

C. A. SIMMONDS

Horticulturist.

Department of Agriculture
Ermelo.

Chief Division of Horticulture,
Pretoria.

I have the honour herewith to submit a concise report on the general conditions and progress of work on this Station for the year ending March 31st, 1913.

Climatic Conditions.

The past season has proved most unfavourable for fruit crops on this station, owing to the severe drought. The wind-breakers of Gums seem to have suffered most, as these have got very thin, and provide but little shelter for the coming season.

The orchard has experienced several hail storms, and in consequence the Apples and Pears are somewhat marked.

Manuring.

All the Apple trees were fertilized with Bonemeal, 10 lb. per tree, but we will only see the result next season, as the drought has prevented the manure from acting.

Cultivation.

The orchard was cultivated throughout the season. A crop of oats was sown between the trees, to prevent the soil from washing. All the spare ground was ploughed and cropped with mealies, teff grass, and millet.

Fruit Crop.

The peaches were condemned as useless and the trees were removed, owing to late frost destroying the crop year after year.

Japanese Plums.

These bore a very poor crop, and the trees have not put on much growth. The climate here seems unsuitable for the growing of plums successfully.

Pears.

A number of varieties have not produced any fruit as yet, whereas others produced quite a fair crop of very fine fruit, of good quality. These are, Bartlett, Beacon, Fertility, Madam Lang and Backhouse Bergamotte. The variety known as Le Comte bore a good crop, but the fruit was small and of very poor quality.

The average revenue from Bartletts, Beacon, and Fertility, per tree of 8 years, being 18s.

Apples.

These have done remarkably well considering the unfavourable conditions. The only varieties failing to bear were Statesman, Spitzenburg, Lady's Finger, Stone Pippin and Sturmer Pippin.

Several varieties such as Early Richmond, Yellow Transparent, Celline and American Golden Pippin have proved to be a failure, and will be worked over. The young Apples planted two years ago are making very fine growth. The best varieties to plant here are: Ohenimuri, Rome Beauty, Delicious, London Pippin, and White Winter Pearmain. These varieties together with Rokewood and York Imperial were stored to test their keeping qualities, and they all stored well, especially Rokewood and York Imperial, which were quite sound until September. The average revenue from Ohenimuri, Rome Beauty, and London Pippin was 20s. per tree, 8 years old.

An exhibit of Apples was taken to 14 shows this year, and information and advice given to fruit growers.

Cider Apples.

These have not proved much of a success yet. Cremure bore a good crop, but about 50 per cent. developed Bitter Pit. Devonshire Red Streak bore a good crop of sound healthy fruit, and it should prove a valuable variety for cider making. None of the other varieties produced a crop.

Insect Pests and Diseases.

All the trees in the orchard were sprayed with lime sulphur solution in the winter.

Woolly Aphis.

This insect is still very troublesome. A spraying experiment was undertaken to test the value of various mixtures. The result was in favour of McDougall's Insecticide, or fruit tree wash, as it keeps the Aphis in check for a longer period and it is cheap and easier to apply than the others.

Bitter Pit.

This disease was rather prevalent on some varieties of Apples, and we hope to experiment with the moisture theory next season.

No other diseases were noticed.

Nursery Work.

The young budded Apples and Peaches that were sent from Zeerust, have not done well owing to the drought. I was unable to irrigate them as we had no water, which resulted in 10 per cent. dying and about 3 per cent. only taking.

Visitors.

We had numerous visitors throughout the year, and to those interested in fruit growing all the advice and assistance possible was given.

Station Work: Improvements, etc.

Crops of Mealies, Oats and Teff Grass, and Japanese Millet were sown. The Millet produced a good crop, but the others were poor owing to the drought. A bore hole was sunk, producing 14,000 gals. water per day; this is insufficient for our requirements. Unfortunately drilling operations had to be stopped, owing to lack of funds. A pumping plant has been erected over the borehole, but it is imperative that we should have a better supply of water.

PROGRESS OF THE FRUIT GROWING INDUSTRY IN THE DISTRICT.

Apples and Pears.

The Orchard work in the district is progressing favourably; at present there are twenty-four Apple Orchards all recently planted—this number would undoubtedly have increased if I had had the opportunity of visiting more farms, as they are now convinced that there is money in the business. My transport, however, does not permit me to do all the travelling that is necessary. A good deal of time is spent on the road, as the farms are a considerable distance from one another.

I have the honour to be,

Sir,

Your obedient Servant,

R. LE SUEUR,

Horticulturist.

Government Fruit Inspector,
Cape Town,
June 10th, 1913.

Chief, Division of Horticulture,
Pretoria.

SIXTH ANNUAL REPORT OF GOVERNMENT FRUIT INSPECTOR, CAPE TOWN, SEASON 1912-13.

The Export Season started in June, 1912, with the shipment of Citrus Fruit, the total quantity shipped through the Port of Cape Town being 6,934 boxes. From this total the following quantities were submitted for Government Inspection here, viz., 3,385 boxes Oranges, 233 boxes Naartjes, and 6 boxes of Lemons. All, with the exception of 55 boxes of Oranges, received the Government Brand. The majority of the balance shipped through this Port came from the Transvaal, where they had previously been inspected and passed.

[U.G. 47—'13.]

Speaking generally, the quality of the Oranges was good. There was, however, a great lack of proper grading, and too many Oranges affected by Red Scale were packed.

The deciduous Fruits shipped during the season under review showed a great falling off as compared to the season 1911-12; the following being the comparative figures and varieties:—

Varieties.	1911-12.	1912-13.	Decrease.
Pears	98,045	58,992	39,053
Grapes	91,942	72,438	19,504
Peaches	31,149	17,518	13,631
Nectarines	4,524	2,649	1,875
Apricots	3,569	1,780	1,789
Melons	585	184	401
Mangoes	542	77	465
Various	203	89	114
Plums	40,694	44,232	3,538
	271,253	197,959	(Increase)

It will be seen that there was a decrease in all varieties shipped, with the exception of Plums.

Of the total of 197,959 cases exported, this office inspected 179,876 cases. With the exception of 12,773 cases they all received the Government Brand, 7,188 cases of the rejected fruit being Grapes, the principal cause of rejection being the bad selection of Fruit and the bunches being totally untrimmed.

There was only one shipper who did not come under Inspection during the whole season.

Attached is a statement of the Fruit inspected by this Office, giving the varieties and grades of each.

From all accounts growers have realized very high prices for their Fruits this season, consequently a heavy export may be expected during next season, and I fear the present Cold Storage accommodation will be inadequate.

Some of the growers in the outlying districts have still a great deal to learn in the handling and packing of fruits for export, and I should suggest that a competent man pay those districts a visit before the start of the coming season, to give demonstrations in the handling and packing of fruit for the export markets, some growers are still inclined to pack a lot of their fruit much too green, and it is hoped that next season they will pick riper and take advantage of the Refrigerator Cars that have been specially built for the traffic.

Arrangements should be made in good time with the Railway Department for a regular supply of Ice on the different branch lines.

I have again carried out experiments for the Cold Storage of fruit, a separate report of which I am submitting to you. As an outcome of these experiments, I am still convinced that Burbank Plums, Yellow Fleshed Peaches, and unripe Grapes cannot be placed on the European Markets in a satisfactory condition. The first named lose all character, Yellow Fleshed Peaches grow woolly after a week or ten days in the Cold Store, and unripe Grapes keep sour and go dull in appearance.

I regret that I have again had occasion to complain of the bad handling of Fruit at some of the Railway Stations, and also to having stuff consigned to both the Imperial Cold Stores and the Harbour Stores loaded in the same truck. This can surely be obviated, and thus save double handling and delay in getting fruit into Cold Stores.

In compliance with the instructions received from you, I have carried out further experiments with regard to the Cold Storage of fruit. These experiments were carried out on slightly different lines to that of last year, the object being not only to find out the best temperature to carry export fruit but also to discover as far as possible what effect the soil and climatic conditions had on the keeping

qualities of the different fruits, the experiments were commenced on the 18th December, 1912 and carried out on to the 10th of April, 1913. The following is a list of the varieties and quantities of fruit received:—

Apricots, 3	Plums Chalcots, 2
Peaches Alexander, 5	„ Shire, 1
„ Cape, 10	Pears B C, 13
„ Yellow Fleshed, 13	„ B B, 1
Plums Wickson, 20	„ B H, 8
„ Kelseys, 8	„ Flemish, 1
„ Apple, 3	„ L Bonne, 5
„ Burbank, 3	„ B Diel, 1
„ Sultan, 1	Grapes Raisin Blanc, 9
Pears B Claire, 1	„ Baille, 3
„ C Buerre, 1	„ Barbarossa, 9
„ D D'angou, 1	„ Muscat Hambre, 3
Nectarines, 8	„ Waltham Cross, 9
Grapes Hermitage, 30	„ Gros Coleman, 6
„ Hanepot, 24	„ Golden Queen, 3

Three cool chambers were placed at my disposal by the Harbour Officials, these were run at the following temperatures, viz., No. 10, 28 to 30 degrees, No. II at 32 to 34 degrees, and No. 12 at 36 to 38 degrees, the average temperature of the ripening room where the fruit was placed after being taken out of the cool chambers was from 55 to 60 degrees.

Of the total quantity of fruit received, the following quantities were allocated to the different chambers:—28 to 30 Degrees, 51 boxes; 32 to 34 Degrees, 88 boxes; 36 to 38 Degrees, 66 boxes.

The fruit being left in the chambers for periods ranging from 18 to 30 days, the various boxes were examined after the required time in the cool chambers and then placed in the passage to ripen up, where it was again examined periodically.

Apricots.

One box was placed in No. 10 chamber and two in No. 12, they were kept from 23 to 30 days, after which they were kept from two to six days. The fruit that was picked on the ripe side turned out well and was of a good flavour, the greener fruit without exception did not colour up and became very woolly.

Peaches, Alexander.

Five boxes of these were placed in No. 12 chamber, three of which were kept for 28 days and two for 30 days, one box that was picked green, kept splendidly and had a splendid appearance for five days after removal from chamber, but on examination was found to be very woolly, another box from the same farm and gathered under similar conditions, but was grown on two distinct soils, viz., sand and clay, the latter being under irrigation, it was found that the fruit grown in clay soil, kept two days longer and was much superior in flavour. I account for this to the dry season and that the sandy soil had suffered, the other three boxes were packed when the fruit was fully matured and turned out in excellent condition and of good flavour. This variety being very scarce this season it was found difficult to obtain a larger number.

Peaches, Yellow Fleshed.

These 13 boxes consisted of the following varieties, Early Crawford, Muirs, Foster Elberte, Constantia Beauty, and Gladstone.

These were placed in the several temperatures and kept for different lengths of time and with the exception of one box they all went woolly, the one exception was packed fully ripe and after being kept 24 days in the lowest temperature, kept for only 4 days after removal from the chamber. Most of these fruits kept their character so long as they were in the cool chamber, provided they were packed in a ripe condition this especially applies to the Elberta variety.

I am thoroughly convinced after the last two years experiments that the Yellow Fleshed Peaches are absolutely useless for our export trade, they cannot stand the lengthy storage required.

Plums, Wicksons.

The experiment with this class of Plum was very interesting. Four boxes were placed in No. 10 chamber, eight in No. 11, and seven in No. 12, these were

kept in the chambers for various periods from 21 to 28 days, one box was kept at fifty degrees at the request of the grower, this only kept for twelve days when it was found to be wastey, in every case the boxes placed in the warmer temperature went off more rapidly than those in the cooler chambers.

The fruit grown on hillside, gravelly, and sandy soil, all retained its appearance, coloured up nicely and was of excellent flavour, whereas the fruit grown in the clays and heavy soils, although of larger size and of good appearance, when eaten, was quite flavourless.

I am convinced that most growers gather this variety of fruit much too green to arrive in England in the best condition.

Plums, Kelsey.

These were placed two in No. 12 and six in No. 11, the first were received on February 18th, these were certainly picked too green, and were kept for 22 days, the one box took eight days and the other nineteen days before ripening up, and was then found to have no flavour. Again with this variety the fruit kept better after being in the coldest chamber, all the fruit came off similar soil, so there are no conclusions to be drawn in this respect. Some were tested to see if the spot they are subject too would further develop in cool store and found no further development under these conditions, this box was kept 26 days in No. 11 and kept sound for ten days after removal.

Plums, Apple.

Three boxes of this variety were kept in the chambers for 28 days, and on removal from the chambers were found to be in very indifferent condition, there is no doubt that this particular Plum requires very careful handling, they bruise very easily and yet should be picked in a ripe condition.

Plums, Burbank.

This variety has again proved itself altogether unsuitable to the London Market, of the three boxes, one was kept for 23 days and the other three for 27 days and in every case though the fruit had a sound appearance it was found to be flavourless.

Plums, Sultan.

Only one box of this variety was used, this box after being 26 days in store was returned to grower. It has been found by experience of growers that only the "first crop" of this is suitable for export, the latter crops not carrying.

Plums, Chalcot.

Two boxes of this variety were placed in No. 11 chamber, one was kept for 28 and the other for 30 days, the idea being to test the keeping capabilities for the American Markets, they both appeared in good condition and kept in very good condition for 5 days afterwards.

Plums, Shire Snomo.

One box of this received, the fruit was in sound condition on receipt being placed in No. 12 for 26 days, on removal they turned soft, dry and flavourless, this is an absolute variety for export.

Pears, B.C.

Thirteen boxes of this variety were received, 7 of which were placed in No. 10, 4 in No. 11, and 2 in No. 12, these were kept for periods ranging from 23 to 32 days in the chambers, and afterwards kept from 1 to 13 days to ripen, the severest test was one box kept in No. 10 for 32 days, which was kept for 13 days afterwards and was then found to be in good flavour and condition. The fruit kept in No. 10 kept longer after removal than the other lots, whereas No 12 showed poor results.

The fruit grown on sandy soil turned out mealy and of poor flavour. There is no doubt the principal point for the growers to have in mind to get the best results from this variety, is to see that it is gathered whilst the fruit is still firm with no signs of ripeness, in fact it should be plucked rather green than otherwise.

Pears, B.B.

Only one box of this variety was received. Knowing its good keeping qualities, it was not deemed necessary to get a large quantity. This fruit was grown in sandy soil, and was kept for 26 days in No. 10, and afterwards was kept for 13 days to ripen up; these turned out mealy in condition.

Pears, B. Hardy.

Eight boxes of these were received; 1 being placed in No. 10, 4 in No. 11, and 3 in No. 12 Chambers. These were kept for periods varying from 25 to 32 days, and afterwards kept from 6 to 16 days. Of the 3 boxes kept in No. 12, one kept for 6 days and the other for 9 days after removal, and only one box was at all satisfactory; the other two were very poor in appearance, having shrivelled and gone mealy. They were all good in the other two chambers, the box from No. 10 keeping sound the longest.

Pears, Flemish Beauty.

Only one box of this was received and placed in No. 11 for 29 days, and was kept for 7 days, when it was found in good condition

Pears, Louise Bonne.

Five boxes of this were received. One was placed in No. 10, 3 in No. 11, and one in No. 12 Chambers. They were kept for 25, 26 and 27 days, and afterwards kept sound for from 7 to 10 days; the box in No. 12 keeping good for only 7 days, and the one in No. 10 for 16 days.

Pears, B. Diel.

One box of this variety was kept for 25 days in No. 10, and afterwards took 20 days to ripen up, when the fruit was good.

Pears, B. Clairgeau.

One box of this was kept in No. 11 for 25 days, and afterwards kept for 16 days to ripen up, when it was found of good appearance and fair as to flavour.

Pears, Easter Beurre.

One box was kept for 25 days in No. 11. The fruit took 20 days to ripen up, after removal from chamber, and turned out of fair flavour.

Pears, Duchess d'Angouleme.

One box was kept for 25 days in No. 11, and afterwards kept for 13 days to ripen up, when the fruit was found of good flavour.

Nectarines.

Eight boxes of these were received, one of each was placed in Chambers 10, 11, and 12. These were given a severe test by keeping them for 32 days, and afterwards kept for 5 days. Those in No. 10 and No. 11 turned out equally well, those in No. 12 went woolly, the one box which was placed in No. 11 was kept for 4 days afterwards, and on being opened it was found of good appearance, but was decidedly acid and was evidently packed too green. The other 4 boxes were sent by Dr. Horace Brown, whose representative, Mr. Lindsell, attended at the Docks to closely watch the experiment. One box was placed in No. 10, 7 in No. 11, and 2 in No. 12. Dr. Brown being of opinion that fruit was carried at too high a temperature, more fruit was placed in No. 12 for that reason, the result, however, disproved this as the fruit put into No. 10 kept longer and in better condition than any of the others.

Grapes, Hermitage.

Thirty boxes of these were used, and having this large quantity, was able to vary my tests. Nine boxes were placed in No. 10, 11 boxes in No. 11, and 10 boxes in No. 12. They were kept in for periods varying from 23 to 32 days, and afterwards kept for periods varying from 2 to 15 days. They were all tested for sugar contents, and found to vary from 15 per cent. to 22 per cent. Again, as with the previous fruit reported on, kept longer in No. 10 and 11 than it did in No. 12—4 boxes of the latter were found to be wasty on removal from the chamber, whereas the shortest time fruit was kept from the other chambers was 7 days. With regard to the sugar tests, any fruit with a lower percentage than 19 per cent. was decidedly sour. Twenty-three days seems to be the limit that these Grapes will stand cold storage if wanted to keep a week or more after removal; those kept in cold store for 32 days went off rapidly after removal. In one instance I had grapes gathered under similar conditions, from adjoining farms, from claysoil and hillside, those from the hillside kept and lasted much longer than the others, and were infinitely of better flavour.

Grapes, Hannepoot.

Twenty-four boxes in all of this variety were used, 7 being placed in No. 10, 9 in No. 11, 8 in No. 12; being kept in cool chambers for periods from 23 to 32 days. Again, with this variety as with the last, in the lower temperature the fruit kept sounder and longer. Most of the grapes of this variety on being tested for sugar, showed 23 to 24 per cent., so that it is hard to make a recommendation, but as they all turned out fairly well, would suggest 22 per cent. as a minimum.

Grapes, Raisin Blanc.

Twelve boxes of this variety were used; 3 were placed in No. 10, 5 in No. 11, and 4 in No. 12, and kept from 25 to 32 days. Those again kept better in the lower temperatures, although to so marked a difference as the other varieties, those showing a sugar percentage of 16 per cent. keeping best; those that averaged 19 per cent. were too ripe, and did not keep so well.

Grapes, Barbarossa.

Nine boxes of these were used; 3 boxes being placed in each chamber for periods of from 23 to 32 days. The difference was more marked in this than in any other variety, those in the higher temperatures keeping very badly. For sugar percentage, would suggest 15 per cent as the minimum.

Grapes, Muscat Hambre.

Only three boxes of this variety was used, one of which was returned to grower by request. One each of the other two boxes were placed in Nos. 10 and 11 for 27 days. That in No. 10 kept for 13 days, and the other for seven days sound after removal from the chambers; the former shower 22 per cent. and the other 19 per cent. of sugar.

Grapes, Waltham Cross.

Nine boxes of these were used; 3 being placed in each chamber for from 23 to 32 days. They all proved good keepers, and showed very little difference in appearance, and as they all tested 17 to 18 per cent. sugar, would suggest 17 per cent. minimum.

Grapes, Gros Colman.

As there were only three boxes of this variety received, and all from the same spot, it would be unwise for me to make any recommendation. These were kept for 23 days in the several chambers, and but for slight shrivelling, kept good for 10 days after removal. The sugar test of these was 17 per cent.

Grapes, Golden Queen.

Three boxes of these were used, and all from the same vineyard. They were placed a box in each chamber. They all went wasty, and consider they were too ripe on receipt, being 20 per cent. sugar; so would not draw any conclusion in regard to this variety.

General Comments.

There is no doubt that as a result of these experiments, it has been conclusively proved that the temperatures that have been used for the carriage of fruit in previous years had been too high, and that the ideal temperature to get fruit to arrive (when all varieties have to be carried in the same chamber) on the London Market in the best condition *i.e.*, so that it will keep for a week or ten days after removal from the ship's cool storage, and then be of good character and flavour, is 32 degrees, and should there be any danger of the temperature varying on the different carrying steamers, there will be no fear of damage being done to the fruit by temperatures dropping (No. 10 chamber being kept at 28 to 30 deg.), but grave danger when the temperature is allowed to rise.

I am still of opinion that much of our fruit is picked in altogether too green a condition. This refers more particularly to Plums, Peaches, and early Grapes, and it is to be hoped that the growers will note this. The rush to have the first fruit on the market may be advantageous to the grower who gets there, but should all growers in the early districts take the same attitude, I fear it would ruin the good name of South African fruits.

With regard to Burbank Plums and Yellow Fleshed Peaches, I am certain it is impossible to get either on to the London Market in a condition fit for consumption.

With regard to soil suitable for fruit growing, I am convinced that the hillside is best for Plums, alluvial soil free from clay and hillside for grapes, heavy soils including clays for Pears, and river silt and alluvial deposits for Peaches, where irrigation is done scientifically and not too soon before gathering fruit, it is a help and will do no harm to the carrying quality of the fruits.

As the Grape is one of the principal export fruits at present I should like to make a special report of them. There is a great advantage in cutting them from the vines at least twelve hours before packing and during damp weather they should be cut at least twenty four hours before, they should be thoroughly thinned, dense bunches invariably going wasty first, and wherever Oidium was seen on the Grapes they went wasty very soon and were soon in a state of Blue Mould.

I trust that these experiments will be carried on for another season, as this last season has been a most unfavourable one to the fruit growers, there being little or no rain and some places that I know personally have not turned out such fruit as would be generally expected, I do not think it necessary to carry out experiments further with regard to temperatures, but I consider it absolutely necessary to go further before we can draw strong enough conclusions to make recommendations to growers with regard to the most suitable soils for the different varieties of fruit.

In conclusion I wish to record my thanks to the following growers for the supplies of fruit for these experiments:—

Meerlust fruit Farms,
J. Van Niekerk,
Cape Orchard Co.,
Hon. Percy De Villiers,
Dr. Horace Brown,
J. P. Du Toit,
Rowland Taylor,

P. J. Cillie C. son,
Principal Elsenburg College,
Warden Porter Reformatory,
Manager, Government Wine Farm,
Henry Meyers,
R. D. Koch.

STATEMENT OF FRUIT INSPECTED AT THE PORT OF CAPE TOWN, SEASON 1912-1913.

	Grapes Passed.			Not Passed.		
	$\frac{1}{2}$ Cases.	Cases.	Crates.	$\frac{1}{2}$ Cases.	Cases.	Crates.
Raisin Blanc	27,970	88	1	473	..	11
Red Hanepoot	10,361	238	48	1,049	25	..
White Hanepoot	7,523	93	17	2,630	19	..
Barbarossa	6,086	133	..	213	18	..
Hermitage	5,108	..	22	2,537	21	13
Lady Downe	861	..	..	24	..	..
Waltham Cross	227	..	..	64	..	..
Black Muscat	176	..	..	..	..	..
Flaming Tokai	487	..	..	19	..	..
Gros Colman	265	..	..	69	..	..
Golden Queen	30	..	..	..	..	..
Gros Moroe	36	..	..	3	..	..
Karoo Belle	6	..	..	..	..	..
Black Alicante	38	..	..	..	..	..
Totals	59,176	552	88	7,081	83	24

	Extra Selected.	Selected.	Graded.	Not Passed.
Peaches	1,983	6,511	6,045	1,695
Pears	6,933	21,767	25,378	1,791
Plums	2,168	17,241	15,793	1,882
Nectarines	170	540	1,445	38
Apricots	3	107	669	162
Melons .. ..	..	..	173	17
Apples .. ..	..	..	132	..
Peach Mangoes .. ..	..	..	74	..
Quinces .. ..	..	..	35	..
Grenadillas .. ..	..	..	3	..
Pomegranates .. ..	..	..	17	..
	11,257	46,266	49,764	5,585

Gross Total, 179,876 Packages.

RALPH J. BULMER,
Government Fruit Inspector.Cape Town,
May 30th, 1913.EXPERIMENTAL ORCHARDS, HORTICULTURAL DIVISION, WARMBATHS AND ERMelo.
STATEMENT *RE*

Farm or Station.	No. of Draught Animals on Farm	Other Live Stock.	Average No. Labourers Employed.	Total No. of Acres.	Total No. of Acres Cultivated	No. of Experimental Plots laid out.
Experimental Orchard, Warmbaths	8	Nil	6	100	43	40 acres
Experimental Orchard, Ermelo ..	4	Nil	6	100	100	50 acres

STATEMENT OF RECEIPTS AND EXPENDITURE FOR THE FINANCIAL YEAR 1912-13.
HORTICULTURE EXPERIMENT STATIONS.

Receipts, including Transfers.	Warmbaths Exp. Station.		Expenditure, including Transfers.	Warmbaths Exp. Station.		Expenditure, including Transfers.	Warmbaths Exp. Station.		Expenditure, including Transfers.	Warmbaths Exp. Station.	
	£	s. d.		£	s. d.		£	s. d.		£	s. d.
Sales of Fruit
" " Scions and Seeds
" " Live Stock
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<i>Administrative Charges :</i>											
Salaries and Allowances
Transport and Travelling
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<i>General Maintenance :</i>											
Labour
Feeding Stuffs
Seed
Manures
Implements and Tools
Wagons, Harness and Repairs
Fruit Boxes
Sundry Stores
Railage and Transport
Entertainment of Visitors
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Total Revenue
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<i>Total Expenditure</i>											
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APPENDIX XI.

ANNUAL REPORT OF THE GOVERNMENT VITICULTURIST

FOR THE PERIOD 1ST JANUARY, 1912—31ST MARCH, 1913.

During the period under review the viticultural work had to be conducted under the same unfavourable conditions as were pointed out in my last report. During the whole of 1912 and up to the 23rd January, the Viticulturist and staff were stationed at Paarl. Subsequent to his additional appointment as Principal of the Elsenburg School of Agriculture, the Government Viticulturist and the Assistant Viticulturist were transferred to Elsenburg on the 23rd January, 1913. Mr. J. C. van Jaarsveld, who was up to this date the foreman at "Belle Vue," was left in charge as manager of the Viticultural Station at Paarl.

STAFF.

My staff at present consists of the following:—

Government Viticulturist, Dr. A. I. Perold.

Asst. Government Viticulturist, W. Wagener, Dipl. Landw.

Field Assistant, A. J. Cloete.

Manager, Viticultural Station, Paarl, J. C. Van Jaarsveld.

Pending the erection of the Oenological Institute, a temporary office and laboratory were fixed up in two rooms of a building at Elsenburg, where the office and laboratory work is carried out as well as possible under the circumstances.

It must, however, be clearly understood, that a great deal of urgently necessary research work will have to stand over until such time as the Oenological Institute is built. It is hoped that this building will be completed near the end of the present year.

With regard to the Viticultural Station at Paarl, I wish to urge most strongly that it be retained for the purpose it now serves. Apart from the fact that the expenditure at this station will in the near future be balanced by its revenue, so that it will hardly cost the country anything, I must urge its retention as a Government Viticultural station on the following grounds:—

(1) To continue the valuable experiment that has been started with 13 of the best varieties of Port grapes, which is to find out what kind of Port wine could be produced on such a soil (decomposed granite) as is found on the slopes of the Paarl mountain, by using Port grapes. This experiment is particularly valuable, since I consider the soil and site as specially promising, and since, if brought to a sufficient degree of perfection, Port wines could very well be exported from this country.

These vines at Paarl are still young, and will only give their first crop at the next vintage. Their best results they will only be able to give some six years hence.

There is a fair amount of the same kind of soil scattered throughout the wine districts, but unfortunately there is none of it available at Elsenburg.

(2) To continue the experiments that have been started on the growing of Sherry varieties and the making of Sherries which have so far been very promising.

(3) To follow up the experiments that have been started with overhead trellising on pergolae with various varieties of table and wine grapes. With regard to the latter the object is to produce a particularly light wine, and also to retard the date of the vintage. These experiments which are well under way, I consider of great importance to our wine industry.

(4) To enable visiting farmers to study the different systems of trellising, as well as the large collection of table and wine grapes which will come into proper bearing next season. With regard to the table grapes, special attention must be drawn to the Ohanez grape from Almeria, which will come into bearing during the next season, and which has been trellised overhead as is customary in Almeria.

5. To continue the experiments in wine making, especially in the making of light wines. The cellar is in an excellent condition for carrying out such experiments. For years to come it will not be possible to carry out these experiments equally well at Elsenburg.

Apart from all this the climate at Paarl differs very materially from that of Elsenburg. The result of the greater heat at Paarl causes an earlier vintage and greater difficulty in keeping down the temperatures of fermentation.

OFFICE WORK.

(a) *Correspondence.*

During the period under review 728 letters were written, mostly to farmers, in reply to queries raised by them. At the same time a large number of pamphlets on various viticultural subjects were distributed.

(b) *General Clerical work apart from correspondence, and including the various returns, reports, keeping of stock ledger, etc.*

Unfortunately, this sort of work takes up a great deal of the Assistant Viticulturist's time, as no clerical assistance is available. Once the Oenological Institute is in working order (most probably next year) the above officer ought to be relieved of all clerical work in order to enable him to devote all his time to research and extension work.

(c) *Publications.*

- (1) "Preliminary Report by the American Stocks Commission," *Union Agricultural Journal*, April, 1912.
- (2) "The Co-operative selling of Grapes," *Union Agricultural Journal*, April, 1912.
- (3) "The use of dynamite in Agriculture," *Die Voorloper*, June, 1912.
- (4) "Report of the American Stocks Commission," *Union Agricultural Journal*, July and August, 1912.
- (5) "The establishment and cultivation of a Vineyard," *Union Agricultural Journal*, January, February and March, 1913.
- (6) "Hints on the use of pure Levures," published as a leaflet.
- (7) In addition to the above the following pamphlets can be obtained both in Dutch and English on application to this office:

- (1) "The manuring of Vineyards."
- (2) "The principal micro-organisms playing an important part in the making and maturing of wines."
- (3) "The principal diseases of our vineyards."
- (4) "Raisins."
- (5) "Drainage."

LABORATORY WORK.

1. *Analytical Work.*

(a) *Wine Analyses:*

During the period under review 77 wines were analysed, involving 160 analyses. These were mostly determinations of alcohol, total and volatile acidity, sugar, glycerine, esters and sulphur dioxide. These analyses will be published in the *Agricultural Journal* in the near future.

It might be pointed out that not only diseased but also some of our very best wines are analysed in order to collect more analytical data concerning them.

(b) *Soil Analyses.*

These analyses consisted of 161 determinations of lime (Bernard's method) in as many soils, that were collected in the Montagu and Robertson Districts. These soils are representative of the cultivated soils (vineyards and Lucerne camps) of the above districts.

It was interesting to find that in only 9 of the 161 determinations was more than 10 per cent. of lime found, and these on the whole only represented patches. In 107 cases the lime content of the soil was under 1 per cent. Hence there are not many of these soils which are sufficiently rich in lime to cause the vines grafted on most American stocks to suffer from Chlorosis.

I wish to point out that in many cases the local farmers speak of "Kalkklip" (limestone) when it is simply weathered shale or "Nabank" with a little whitish layer of lime and other salts on its surface. In nearly all such cases the soils con-

tain under 1 per cent. of lime, and are thus not nearly so rich in lime as is generally believed.

Still that this shale is relatively rich in calcium compounds is shown by the pockets of gypsum one frequently finds in it.

The contents of such a pocket in this shale from near Nuy Station proved on analyses to contain as much as 91 per cent. gypsum.

(c) *Analyses of manures.*

In order to have some idea of the amount of Potash contained in the Karroo Kraal ash bought last year through the agency of the Paarl Farmers' Association, 7 samples of Kraal Ash from various buyers were analysed, with the following results:—

Samples.	1	2	3	4	5	6	7
Percentage Potash as K_2O ..	9.96	9.30	9.60	9.80	8.10	4.25	3.12
Percentage Phosphoric Oxide (total)	1.23	2.52	2.33	..	..	1.90	1.01

NOTE.—Samples 1, 2, 3 and 4 were fresh ash. Sample 5 was sold as fresh ash, but evidently was not quite fresh. Samples 6 and 7 were old ash.

In the case of sample 2 the total potash soluble in dilute, boiling, hydrochloric acid (for 1 hour) was compared with that soluble in water.

Further the alkalinity of the ash was determined in order to give some idea of the amount of potash present as carbonate.

The following results were obtained:—

Potash as K_2O , sol. in dil. Hydrochloric acid	...	...	...	9.30 %
„ „ sol. in water	...	...	...	6.00 %
„ „ derived from alkalinity of ash	...	...	...	3.60 %

This clearly proves that the greater part of the potash in the Kraal Ash is not present in the form of carbonate.

From the above analyses it is further clear that, whereas the potash contents of fresh Kraal Ash is usually near 10 per cent., it may easily fall to 4 per cent. or less in old ash. Hence only fresh ash should be bought where the cost of transport is high.

The total phosphoric oxide in Karroo Kraal Ash may generally be taken as about 2 per cent.

2. *Vine Diseases.*

On the 20 specimens of diseased parts of vines that have been sent in for diagnosis and advice *re* treatment, the following diseases were found:—

- Anthraxnose.
- Anthraxnose ponctuée,
- Oidium.
- Erinosis (Knoppiesblaarziekte).
- Root eels.
- Phylloxera.
- Mealy bug.
- Grey rot (*Botrytis cinerea*).
- Bacterial wound disease on young grafted vines.
- Magarodes.
- Physiological troubles due to unfavourable weather conditions.

3. *Cultivation and preliminary study of Cape Wine-levures and their use in wine-making.*

These levures have been selected from Paarl grapes and young wines during the early part of 1910. They have meanwhile been partly studied by conducting fermentation experiments with them in the laboratory. Some of them were sub-

sequently used during the 1911, 1912 and 1913 vintages both at the Paarl Viticultural Station, and by some of our leading wine farmers and co-operative wineries. A preliminary resumé of the results obtained up to and after the 1912 vintage was published in the "South African Journal of Science," April, 1913, under the heading of "Cape Wine-Levures and their use in wine-making: A preliminary study." This paper was read before the "South African Association for the Advancement of Science" during its Annual Congress at Port Elizabeth, in July, 1912. The present value of these investigations is mainly centred in the high percentage of alcohol that can be formed by most of these levures; 10 of them having formed from 15.70—16.37 per cent. alcohol by volume in the laboratory experiments.

In the Cellar experiments, where these pure levures had been used, the young wines (in two leaguer lots) had as much as 15.19, 15.23 and 15.34 per cent. of alcohol by volume, and were quite dry.

The chief advantages gained, consisted in a regular and fairly rapid fermentation, so that the sugar was soon decomposed, and the young wine got clear very early in winter; further the wines had a clean taste in each case. Also a very good light wine, 11.35 per cent. alcohol by volume, could be made by using these pure levures, although the temperature of fermentation unavoidably went up to 38° C. or 100.4° F.

During the 1912 and 1913 vintages 60 bottles of these pure levures were supplied to farmers and wineries that applied for the same. So far, not only have no complaints been received, but invariably good results were obtained, and those who once used these levures are very keen on having them regularly in future.

I feel confident that a still larger use of these levures will materially assist farmers to produce more sound and better wines.

In many cases diseased wines that were sent in for examination need not have gone wrong at all had the fermentation started soon after the grapes had been crushed, and had the must contained a large percentage of pure wine yeast when the temperature of fermentation rose too high without anything being done to cool the must. Both these difficulties could have been overcome by a rational use of pure levures. I have at present a leaflet in both Dutch and English which is sent along with each consignment of pure levures, as to how these levures should be used.

CELLAR EXPERIMENTS.

(a) *Vintage, 1912.*

Approximately 27 Leaguers of wine were made, and 32 gallons of wine brandy at 76 volume per cent. of alcohol distilled from wine made in 1911. This brandy was required for making Ports, Sherries and Sweet Wine during 1912.

The above total of 27 leaguers consists of:—

White French (light wine)	2 $\frac{3}{4}$	leaguers.
Green Grape (heavy, for sherry)	2 $\frac{1}{2}$	"
Green Grape (lighter)... ..	1 $\frac{1}{2}$	"
Hanepoot (dry)	2	"
Heavy Green Grape	1 $\frac{1}{2}$	"
Green Grape	5 $\frac{1}{2}$	"
Muscadel (sweet)	2 $\frac{1}{2}$	"
Pontac (sweet)	2 $\frac{1}{2}$	"
Pontac (aftreksel)	1 $\frac{1}{2}$	"
Hermitage	2	"
Men's Wine	2 $\frac{3}{4}$	"
Total	27	"

With regard to the above wines the following data are of sufficient interest to warrant publication:—

1. *White French* (for a special light wine).

The must showed 19.7° on the Balling Saccharometer and 4.8 per mille total acidity as tartaric acid. The latter was raised to 6 per mille by an addition of tartaric acid.

The grapes were crushed and immediately pressed to separate the must from the stalks and husks. The must was pumped into a cement tank, and $\frac{1}{2}$ lb. of Pot. Metabisulphite added per ton of grapes in order to prevent any fermentation and to allow the must to clarify. The next day the clear supernatant liquid was drawn off and pumped into a stukvat. The must was then inoculated with about 1 per cent. of pure levures, and started fermenting after about one week. The maximum temperature of fermentation was 30° C., or 86° F., and the fermentation lasted for fully a month. The wine was then treated in the usual way. On the 4th June the wine was analysed and gave the following results:—

Alcohol	...	...	...	11.59 per cent. by volume.
Volatile acidity	...	...	...	0.65 per mille as acetic acid.
Total acidity	...	...	...	5.4 per mille as tartaric acid.

The wine is at present still maturing, and thus far promises well.

It is interesting to note that the alcoholic strength of this wine is such that 10 vol. per cent. alcohol exactly corresponds to 17° Balling, *i.e.*, 100 c.c.m. alcohol from 170 grammes sugar, which is the ratio usually recognised as normal.

2. *Green Grape for sherry.*

Composition of must: Sugar, 24° Balling.

Total Acidity 7 per mille as Tartaric Acid.

The must was fermented by itself with pure levures, and 1 lb. of Plaster of Paris per 500 lbs. of grapes added to it before fermentation set in. Maximum temperature of fermentation 35° C. or 97° F.

After 6 weeks the wine was clear and dry. On the 3rd of June it was analysed with the following results:—

Alcohol	...	...	...	14.0 vol. per cent.
Volatile acidity	...	...	...	0.57 per mille as acetic acid.
Total acidity	...	...	...	6.5 per mille as tartaric acid.

Early in October the wine was put into hogsheads which were made three-quarters full, and was fortified by means of a wine brandy of 81 vol. per cent. alcohol in order to bring the wine in the various hogsheads up to respectively 15, 15½, 16, 16½ vol. per cent. of alcohol. In each case the wine was inoculated with a pure culture of *Mycoderma vini* (Flowers of wine), but no growth took place in a single instance. At present this wine is promising to develop into a very good sherry.

Note:—Also in this case the ratio of alcohol to sugar is 10 vol. per cent. alcohol for 17° Balling or 170 grs. sugar per litre of must.

3. *Muscadell and Pontac for Port Type.*

(a) *Pontac*:

Composition of must: Sugar, 23° Balling.

Total acidity, 9.8 per mille as Tartaric Acid.

The crushed grapes were inoculated with pure levures and the must drawn off after two days; when the Balling Saccharometer read 9 degrees. The temperature then was 34° C. or 93.2° F.

The must was pumped into a stukvat and well mixed with sufficient wine brandy of 68 vol. per cent. alcohol in order to keep the wine somewhat sweet and bring its strength up to about 17 vol. per cent. alcohol. The fermentation stopped the next day. The wine was racked a fortnight later.

On analysis on the 3rd June the following results were obtained:—

Alcohol	...	...	...	16.84 per cent. by volume.
Volatile acidity	...	...	...	0.69 per mille as acetic acid.
Total acidity	...	...	...	7.00 per mille as tartaric acid.
Sugar	...	...	...	1.4 per cent.
Colour	...	...	...	very dark.

(b) *Muscadell*:

Composition of must: Sugar, 25.2° Balling.

Total acidity, 5.6 per mille as tartaric acid.

The crushed grapes were inoculated with pure levures and allowed to ferment in an open cement tank. After 2 days the must was drawn off and fortified similarly as the Pontac. The fermentation in this case continued slowly for 7 days, when it was checked by an introduction of 30 mgrs. liquid sulphur dioxide per litre must. The wine was racked 8 days later. On analysis on the 4th June the following results were obtained:—

Alcohol	...	...	...	16.44 per cent. by volume.
Volatile acidity	...	...	...	0.69 per mille as acetic acid.
Total acidity	...	...	...	5.6 per mille as tartaric acid.
Sugar	...	...	...	3.6 per cent.

The wine was then still sweetish and had a very strong and pleasant Muscat flavour.

During August the Pontac and Muscadel were blended 1 to 1 on being racked, so as to produce a wine of a Port type. Half of this wine is now maturing in hogsheads and half was sold last October at £12 10s. per leaguer, when a good ordinary wine fetched only £6.

4. *White Hermitage.*

Almost one hogshead of White Hermitage was made by crushing Hermitage grapes, and taking the juice that ran off without any pressure being applied. The must was inoculated with pure levures and allowed to ferment in a hogshead. The wine was perfectly white and soon got quite bright. It had a flavour and taste of its own, and was quite an interesting wine. This experiment will be repeated on a larger scale during the 1914 vintage.

(b) *Vintage, 1913.*

The total crop gave $17\frac{1}{2}$ leaguers of wine consisting of:—

White French	...	...	...	...	...	2 Leaguers.
Green Grape (light)	...	...	...	...	...	2 „
Green Grape (spoiled grapes)	...	...	...	...	...	2 „
Green Grape and Stein (for Sherry)	...	...	...	...	...	$2\frac{1}{2}$ „
Green Grape (Sauterne type)	...	...	...	...	...	1 „
Hanepoot (sweet)	...	...	...	...	...	1 „
Hermitage	...	...	...	...	...	2 „
Pontac (dry)	...	...	...	...	...	$2\frac{1}{2}$ „
Men's Wine	...	...	...	...	...	$2\frac{1}{2}$ „
Total						$17\frac{1}{2}$ Leaguers.

The deficit of $9\frac{1}{2}$ leaguers as compared with the 1912 vintage is accounted for as follows:—

- (1) Last year four leaguers of wine were made from grapes bought from a neighbour, which was not repeated this year.
- (2) Certain parts of the vineyard have to be uprooted and the land trenched for experimental purposes. This accounts for a further four leaguers deficit.
- (3) The remaining deficit of $1\frac{1}{2}$ leaguers is due to a general shortage experienced on most farms this year.

As these young wines have not yet been analysed, I shall report on them next year.

VINEYARDS AT THE VITICULTURAL STATION, PAARL.

(a) *Ampelographic Collection.*

This collection comprises about 130 varieties of table and wine grapes. Most of these have come into bearing this year. During the next season they will all be in full bearing, and will certainly be worth visiting. Of the table varieties I wish specially to mention the following, of which a limited number of cuttings will be available next winter:

White Table Varieties:

Madeleine Angevine, Chasselas doré de Fontainebleau, Précoce de Courtiller, Muscat de Saumur, Madeleine Royale, Shavoah, Rosaki di Smyrna, Dattier de Beyrouth, White Crystal, Raisin Blanc, Waltham Cross, Ohanez (Almeria), Sultana, Bailey, Golden Queen, White Hanepoot.

Black and Red Table Varieties:

Henab Turki, Gros Colman, Barlinka, Karroo Belle, Barbarossa, Flame coloured Tokai, Red Hanepoot, Prune de Cazouls, Meraviglia de Malaga, Perricone, Grossa Vivarais, Bonnet de Retord, Black Mannukka, Frankenthal, Gros Maroc. Muscat Madresfield Court, Black Prince, Muscat Hamburgh, Castiza, Molinera gorda, Rosada, Black Hamburgh, Black Spanish.

The various varieties of wine and table grapes contained in this collection will be studied and reported upon from time to time.

Apart from the varieties already established at Paarl, there are at present 78 varieties of table and wine grapes under quarantine at the Rosebank Experiment Station, and these will be propagated at Paarl and Elsenburg as soon as possible.

Most of these varieties were imported in order to see whether they would not give superior wine and table grapes to those already cultivated in this country. I wish to point out that the wine grapes include all the best varieties that serve as the basis for the various famous wines made in the different wine countries of Europe, such as Moselle and Rhine wines, Chablis, Burgundies, Clarets, Sauternes, (Cognacs), Chianti, Marsala, Tokai Wine, Sherries and Ports.

(b) Port Vines.

At this Station there are at present 1,000 Port vines of the following 13 varieties:—Mourisco Tinto, Mourisco de Semento, Malvasia Rey, Malvasia Preta, Bastardo do Menudo, Bastardo de Castello, Tinto Cao, Tinta Francisca, Tinta Roriz, Touriga, Grenache Noir, Formosa, Codega.

These are all grafted on Jacquez, and are doing very well. Half of them were planted in 1911 and half in 1912. Those planted in 1911 will give their first crop in 1914. They all seem to be very vigorous growers.

(c) Sherry Varieties.

Thus far 300 vines of Pedro Ximenez on Aramon Rup. Ganzin have been planted. This variety will be increased to 400, and 600 of Palomino and Castellano planted as soon as possible.

(d) Other young Plantations.

During 1912 the following were also planted:—

- 800 Riesling on Jacquez.
- 400 Cabernet Sauvignon on Jacquez.
- 200 Red Muscadel on Jacquez.
- 114 Muscat de Frontignan (Cape, rose) on Aramon Rup. Ganzin.
- 86 Muscat de Frontignan (French, white) on Aramon Rup. Ganzin.

For the extension of the Ampelographic Collection 922 cuttings of the following American stocks were planted:—

Aramon Rup. Ganzin No. 1, Aramon Rup. Ganzin No. 2, Rip. x Rup. 3306, Rip. x Rup. 3309, Rup. du Lot and Jacquez.

Provision was made for 72 new varieties of grapes to be grafted on each of the above-named stocks.

(e) Almería Grapes.

In order to find out whether these grapes can be successfully grown at Paarl, 96 vines of Ohanez, which is the Almería Grape par excellence, were grafted on the spot, half on Aramon Rup. Ganzin and half on Jacquez in 1911. An overhead trellis (7 feet above the ground) for these was constructed during 1912. These vines grew very vigorously. This year they had a few bunches of grapes, which assumed the reddish tint on ripening which materially enhances the value of this grape. Late in May, after several rains had already fallen, these grapes were still perfectly sound on the vine. It will probably be found that the Ohanez grape can be grown best on overhead trellises, as is done in Spain. The vines should always be long pruned, bearers being 3-6 feet long.

In addition to this white variety, the coloured varieties of Almería Grapes (Castiza, Molinera Gorda and Rosada) were also imported, and form part of the Ampelographic Collection

[U.G. 47—'13.]

(f) *Systems of Trellising.*

During 1912 the various trellises were erected. The whole Ampelographic Collection will be pruned after the Cazenave system. (See February number of the *Union Agricultural Journal*, 1913).

Special trellises consisting of single and double Pergolae (inclined overhead trellises) were erected during January, 1913. The vines for these pergolae, grafted on the spot in 1911, consist of:—Red and white Hanepoot, Barlinka, Barbarossa, Red and White Muscadel, White Green Grape, Vaalblaar Stein, White French, Hermitage, Cabernet Sauvignon, Gelber Mosler, Sauvignon Blanc and Sémillon.

Further, trellises have been erected to demonstrate the following systems of pruning:—Spalier, Taille Cazenave, Taille Guyot (single and double) and Fish Spine. In addition to the above some vines will be attached to stakes (échelas) and pruned accordingly.

(g) *American Mother Vines.*

A small number of the following vines have been planted out in 1911 and 1912:—Moutvèdre x Rup. 1202, Tisserand or Cabernet Berlandieri 333 E.M., Chas-selas Berlandieri 41 B., Rip. x Berlandieri 420 A., Rip. x Cordifolia 125-1, Rip. x Monticola 1 R., Rip. x Monticola 2 R., Rip. x Rup. 3306, Rip. x Rup. 3309, Rip. Gloire de Montpellier, Herbemont Blanc, Rip. x Berl. 34 E.M., and a few others still to be identified.

In addition to the above the following stocks have been imported and planted out at Rosebank during 1912:

Rip. x Berlandieri 157-11.
Rip. x Cordifolia Rup. 106-8.
Rip. x Solonis 1616.
Berlandieri Resseguier No. 2 (all dead).
Berlandieri Richter (all dead).

The first three are doing very well and will be propagated this year.

(h) *Manurial Experiments.*

In these experiments the following 4 manurial formulae have been adopted:—

			Govt. Guano.	Karoo Ash.	Sulphate of Potash.	Basic Slag.
			lbs.	lbs.	lbs.	lbs.
Formula A	..	..	700	760	..	400
Formula B	..	..	700	760	..	..
Formula C	..	..	700	..	152	90
Formula D	..	..	700	..	272	90

The above quantities refer to one morgen of vines. The actual size of each experimental plot is about 1/20 morgen, containing 200 vines. These experiments were started in 1912. As the vines were only planted in 1911, no results were thus far obtainable. It is however, intended to continue these experiments regularly as long as possible.

The main objects in view are to test the specific influences of potash and phosphoric oxide both on the quantity and quality of the grapes and wine produced, and also to compare the action of Karroo Ash with that of pot. sulphate.

(i) *Affinity of Pontac.*

The Pontac at this Station is from 12 to 15 years old, and is grafted on various American Stocks. Last year these vines showed an exceptionally large number of wild shoots (uitlopers), so that it was a favourable opportunity of enquiring into the question of the affinity for the various stocks. The total number of

Pontac vines investigated was 520. These were divided amongst the different stocks as follows:—

Name of Stock.	Total number of Vines on it.	Good.	Medium.	Bad.
Large Blinkblaar Rup...	389	66 %	29 %	5 %
Aramon Rup. Ganzin, No.1	111	13 %	40 %	47 %
" " " " „2	10	10 %	30 %	60 %
Rip. Gloire de Montpellier	10	25 %	50 %	25 %

Since the soil is a loose, deep, rich loam, which keeps cool in summer, and since the Green Grape answers well in it on all the above stocks, it is reasonable to deduce from the above table that neither Aramon Rup. Ganzin (both Nos. 1 and 2), nor Rip. Gloire de Montpellier is a suitable stock for Pontac. The large Blinkblaar Rup. has clearly given very satisfactory and much better results than any of the others. I shall propagate it this year in order further to experiment with it.

(j) *General Work.*

During 1912 half a morgen of existing vines was uprooted and trenched for new plantations. A terrace was constructed in front of the main residence and planted with lawn grass. Further the ordinary routine work on a wine farm was carried out. Since my transfer to Elsenburg the present manager has had sole charge of the Station, and he has kept both the vineyards and the cellar in a most excellent condition. During the period under review the Station was frequently visited by farmers and others interested in its work.

OUTSIDE WORK.

(a) *Investigation into grafted vines.*

During December, 1912, the Government Viticulturist and Mr. I. Tribolet of Elsenburg, made a rapid inspection of 105 different vineyards in our wine districts, in order to enquire into the state of the vines grafted on the various stocks. A full report on this tour of inspection was published in the July and August numbers of the *Union Agricultural Journal*, 1912. Owing to the large number of failures of different stocks, principally Metallica and Jacquez, experiment plots of American vines were planted in 1912 in the following places:—

1. Mr. Jac. Scholtz's farm, Helderberg.
2. Mr. H. Hofmeyr's farm, above Somerset West.
3. Mr. F. J. Hugo's farm, Achter Paarl.
4. Mr. Roberts' farm, Mooikelder, Paarl.
5. Mr. S. Rossouw's farm, Klein Drakenstein, Paarl.
6. Mr. P. J. Hugo's farm, Daljosaphat, Paarl.
7. Mr. W. F. Duckitt's farm, Oranje Fontein, Darling.
8. Mr. J. J. de Villiers' farm, Dunghye Park, Caledon.
9. Mr. A. S. Roux's farm, Radyn, Villiersdorp.
10. Mr. G. Euvrard's farm, Tulbagh.
11. Mr. Flip Malherbe's farm, Ezelfontein, Ceres.
12. Mr. P. Conradie's farm, Warm Bokkeveld, Ceres.
13. Mr. I. S. Perold's farm, P.A. Hamlet, Ceres.
14. Mr. J. G. Perold's farm, P.A. Hamlet, Ceres.
15. Mr. T. C. Botha's farm, Botha's Halt.
16. Mr. I. Malherbe's farm, De Doorns.
17. Mr. C. P. Naude's farm, Overhex, Worcester.
18. Mr. A. P. Burger's farm, Nuy.
19. Mr. J. Rabie's farm, Leipzig, Nuy.
20. Mr. J. S. Minnaar's farm, Robertson Station.
21. Mr. Joh. Bruwer's farm, De Hoop, Robertson.
22. Mr. Izak Malherbe's farm, Vrolikheid, Robertson.
23. At the Robertson Experiment Station.
24. Mr. R. P. Du Toit's farm, Montagu (town).
25. Mr. P. Du Toit's farm, Keisie, Montagu.
26. Mr. A. Burger's farm, Talana, Montagu.

As the cuttings of the newer varieties that could be supplied were often very thin, all the cuttings were in several instances first planted out in a nursery to be put out on the experimental plots during the present year. In the case of Nos. 4, 12, 16, 19, 21 and 22, no interest was taken in the work so that it resulted in a total failure. In these cases the experiments will not be continued. It is however intended to start some further experimental plots on other farms in the near future.

These experiments have been so planned as to include all the different kinds of soils and climatic conditions of our wine districts.

The following American stocks are being and will be included in these experiments:—

1. Aramon. Rup. Ganzin No. 1.
2. Aramon. Rup. Ganzin No. 2.
3. Mourvèdre x Rup. 1202.
4. Rip. x Rup. No. 3306.
5. Rip. x Rup. No. 3309.
6. Rip. x Rup. No. 101-14.
7. Rup. du Lot.
8. Rup. Metallica (Constantia).
9. Rip. Gloire de Montpellier.
10. Rip. x Monticola No. 1 R.
11. Rip. x Cordifolia No. 125-1.
12. Rip. x Cordifolia Rup. 106-8.
13. Rip. x Berlandieri No. 34 E.M.
14. Rip. x Berlandieri No. 420 A.
15. Rip. x Berlandieri No. 157-11.
16. Rip. x Solonis No. 1616.
17. Chasselas x Berlandieri No. 41 B.
18. Cabernet x Berlandieri No. 333 E.M.
19. Jacquez.
20. Herbemont Blanc.

Once these stocks are well established, they will be grafted with the most important varieties of grapes for each locality.

(b) *Lectures.*

During the period under review, the following lectures were delivered:—

1. "Experiments on wine-making conducted at the Paarl Viticultural Station," before the Paarl Farmers' Association, on the 21st February, 1912.
2. "On American Vines," before the same Association on the 30th April, 1912.
3. The same lecture before the French Hoek Farmers' Association on the 11th of May, 1912.
4. "Aspects of Viticulture in South Africa," before the Agricultural Union Congress at East London on the 28th August, 1912.
5. "On American Vine Stocks," before the Constantia Fruit Growers' Association on the 18th September, 1912.
6. "On the importance of the cultivation of Grapes for Export," before the Graaff-Reinet Fruit Growers' Association in September, 1912.
7. "On the racking of wines," before the Paarl Farmers' Association on the 13th December, 1912 (by the Assistant Government Viticulturist).
8. "On Oidium, Anthracnose and the Mealy Bug," before the same Association as above, on the 25th of March (by the Assistant Government Viticulturist).

(c) *Shows.*

On the Paarl, Stellenbosch and Rosebank Agricultural Shows an exhibit was placed, of the various wines made, and about 100 varieties of the grapes grown at the Paarl Viticultural Station. This exhibit was generally admired at these Shows.

In addition to the above, also modern cellar implements and specimens of diseased parts of vines (not at Rosebank) as well as the cultivation of pure levures were shown. A responsible officer of my staff was always in charge of the exhibit, and gave any desired information to visitors, who, at their request, were also presented with copies of the various publications on Viticulture and wine-making already enumerated in this report.

(d) *Visits to farms and Wineries.*

Both the Government Viticulturist and the Assistant Government Viticulturist visited a large number of farms and wineries to investigate diseases of vines on the spot, give general advice on viticultural questions, taste wines, etc.

In conclusion I have most gratefully to acknowledge the loyal support I have always received from all the members of my staff. The Assistant Viticulturist deserves special mention for the excellent work he has done, not only in the office and outside of it, but also in the Laboratory, where he has had charge of a large amount of research and analytical work, which was always carried out in a most creditable manner.

A. I. PEROLD,

Government Viticulturist.

Elsenburg, 29th June, 1913.

VITICULTURAL STATION, PAARL—STATEMENT *RE.*

Farm or Station.	No. of Draught Animals on Farm.	Other Live Stock.	Average No. Labourers Employed.	Total No. of Acres.	Total No. of Acres Cultivated.	No. of Experimental Plots laid out.
Viticultural Station, Paarl.	1 horse	Nil	3	10	8	4 manurial; remainder for different experiments.

STATEMENT OF RECEIPTS AND EXPENDITURE, PAARL VITICULTURAL STATION, 1912-13.

	RECEIPT (INCLUDING TRANSFERS).			EXPENDITURE.			
	£	s.	d.		£	s.	d.
Sales of Wines	94 17 7	Salaries and Allowances ..	..	..	546 13 4
Sale of Stock	7 10 0	Transport and Travelling ..	..	..	91 2 6
Sale of Vine Cuttings	8 0 6				
				<i>General Maintenance.</i>			
				Wages and Rations ..	..	..	274 11 8
				Fustage ..	..	..	42 13 8
				Apparatus and Machinery ..	..	..	237 8 6
				Sundry Equipment ..	..	..	1 5 4
				Feeding Stuffs ..	..	..	4 2 0
				Purchase of Transport ..	..	..	45 0 0
				Incidentals ..	..	..	19 16 3
				Purchase of Vine Cuttings ..	..	..	624 17 5
							60 13 0
				<i>Permanent Improvements.</i>			
				Fencing Material ..	..	..	133 13 3
Total Revenue	£110 8 1	Total Expenditure ..	..	..	£1,456 19 6

APPENDIX XII.

GOVERNMENT FARM, CONSTANTIA.

Annual Report for period 1st January, 1912, to 31st March, 1913.

Period 1st January—31st March, 1912.

The harvesting period commenced on the 6th of March, and ended on the 4th of April. With the exception of a few very hot days which necessitated the use of attemperators, and two rainy days, the weather conditions were fine.

Sugar ran satisfactorily, ranging from 18 per cent. to 29 per cent. The latter was found in the Muscadel, a three year old vineyard. The return was a larger one than that of the previous year by 545 gallons. For the district it was an abnormal one, in some instances the return being as much as 900 gallons per acre.

A large amount of decay occurred in the Hermitage, resulting in several vats of inferior light wine, only fit for distillation. For the manufacture of the better wines the best fruits were used. The total yield amounted to 13,256 gallons:—

Red wine blends	5,575	gallons.
White wine blends	4,460	„
Cabernet	2,230	„
Hermitage	2,230	„
Press wine and inferior Hermitage	3,257	„
Pedro Ximenes	204	„
Sweet Constantia	300	„

With regard to the latter it is satisfactory to note that the sugar contents appear to increase with the ageing of the vines, and there is every indication that the old time sweet wines will again be produced from the grafted shrub. No wines were exhibited owing to the writer having undertaken to act as Judge at the Annual Wine Show.

During the year two students were in attendance for practical instruction in wine making. One took the full course, and the other remained for the actual vintage only.

Period 1st April, 1912—31st March, 1913.

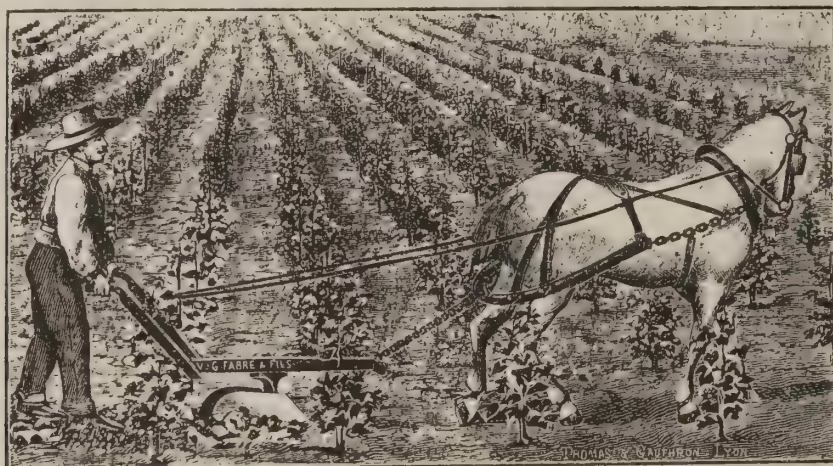
For the twelve months ended 31st March, 1913, the daily-paid men employed amount to an average of 13.6 units per day, in addition to four monthly paid hands. All trenching was done by contract, such assistance not being here included. During the fruit and harvesting season, for about two months, a larger number of men are employed, which increases the average during that time. The daily units then employed average 16.3.

Vineyards and Vintage.

Areas occupied by American stocks have been replanted with Pontac grafted on Aramon, Metallica, and Du Lot, with Red Muscadel grafted on Metallica, with Hanepoot grafted on Jacque, and with some imported Port varieties grafted on Jacque, all of which have grown very satisfactorily.

The growing season commenced with unsuitable weather conditions, and during September the largest amount of rain for the year was registered, namely, 9.07 inches, whilst the average minimum temperature for the month registered was 48.9 deg., which for the same month in 1911 was 54 deg. These unsuitable conditions seriously affected the sprouting vegetation, and was most marked in vines growing in clayey soils, which only recovered normal growth in December, in most cases minus any fruit. A tonic in the form of guano was administered in order to hasten the growth and maturing of wood for the ensuing year.

In loose and sandy soils the ill effects were less severe. Diseases were conspicuously absent, and Calandra (*Phlyctinus colossus*) with the exception of a single block of young vines, gave no trouble; one application of Swift's Arsenate of Lead being sufficient to destroy them. The newly introduced harness from France for use in vineyard cultivation, proved a great success and is strongly recommended, the single trace system obviating the use of the swingle bar, which otherwise does so much damage to the vines by injuring the young shoots. An illustration is enclosed.



Manurial experiments with blocks of Muscadel and Hanepoot were carried out in conjunction with South African Potash Syndicate, Ltd., who supplied the manures gratis. The treated blocks showed greater growth and were far more advanced than any other on the Estate, early in the season, more particularly the Hanepoot, none in the District equalling it at that time. It was thought that a higher sugar percentage may result with potash manures, but other factors also existed to procure this end, and results were, therefore, not definite. Reference is made to the small amount of rain, .74 inches only having fallen during January to March, which naturally resulted in higher sugars and less juice. It is intended to continue these manurial experiments on the same blocks for several years.

Most favourable conditions for wine making prevailed. During the period 6th March—6th April, 1913, only .07 inches of rain was registered, and temperatures, with the exception of a few days, were low. A departure from previous methods was introduced by utilisation of pure levures, selected and cultivated on the Estate. Results, however, indicate that more experimental work is necessary in this direction before pure yeasts can be applied on a large scale in our climate.

The tanks of must inoculated rose to abnormal temperatures, which was not the case with the tanks in which spontaneous fermentation generated. High temperatured fermentations are desirable in red wines, but not too high, for the latter results in high volatile acid.

The vintage is a smaller one than last year's, which is the case throughout the District. Factors accounting for this were, as previously stated, the heaviest rainfall of the year falling during September, accompanied by cold, and followed up during the ripening and harvesting periods by a scanty rainfall.

In 1908 it was decided by the Department of Agriculture, with the advice and consent of local viticulturists, that experiments be made with the object of again producing the old type of sweet wines, but many of them contended that with the grafted vine this was impossible, and even represented a change of climate as one of the stumbling blocks. In 1909 annual report the average rainfall was given for 19 years, which showed the latter objection to be incorrect. That year a commencement was also made, and the first block of grafted Muscadel was planted.

In 1911 a small yield was obtained, with low sugar. In 1912 the sugar amounted to 27 per cent., and sixty gallons of sweet wine were made, but not of the desired quality. The 1913 crop, with a rainfall of 39.12 inches has resulted in the production of about 200 gallons of Sweet Constantia which promises well. The sugar content in the must amounted to 37 per cent.,

which is unusual and satisfactory, inasmuch as it proves that with American stock the reproduction of the old type of wine is practically assured.

Some of this wine, seven days after making, was submitted to ozonisation with good results.

Pedro Ximenes, trellised, also yielded 27 per cent of sugar, and the Sweet Wine made therefrom is excellent. The total yield amounted to:

Cabernet	1,360	gallons.
Cabernet-Hermitage blend	4,605	„
White Wine	3,724	„
Press Wine	2,664	„
Sweet Constantia	275	„
Sweet Pedro Ximenes	290	„
Sweet Hannepoot	542	„
Hermitage, etc.	280	„
Total	13,740	gallons.

being 4,516 gallons less than the 1912 vintage. The shortage would have been greater but for the Hannepoots being turned into Sweet Wine. All the grapes were sound and healthy, and sugars well maintained. A portion of the vintage will be treated with ozone and the results will be tabled in the next annual report.

The water supply caused some anxiety, the yield from the bore-hole falling away to about half what it gave last year. This necessitated a great deal of pumping to meet cellar requirements.

Large demands for American stocks continue year after year, the uprooting of the Metallica blocks has caused a shortage in the supply, as this stock appears to be as popular as ever. The following represents the kinds and varieties distributed from here: Aramon, Jacquez, Metallica, and the following hybrids: "1202," "3306," "3309," "101-14."

Orchards

The usual requisite attention has been bestowed upon these. After pruning, a thorough spraying was carried out, with Lime-Sulphur concentrated and made on the Estate. Good results were obtained with the home-made article, and tests were also made with the imported Lime-Sulphur wash. The formula used was 50 lb. stone lime, 100 lb. sulphur fine, and 40 to 50 gallons of water. This was boiled in a home-made wooden-sided box, with sheet iron bottom, measuring 6 feet by 3 feet, and 18 inches deep, with 2 inch planks and 1-8th inch galvanised iron bottom nailed on, which in all cost £2 10s. The actual cost of the Lime and Sulphur amounted to 9d. per gallon, as against 5s. for the imported article.

The mixture was then diluted according to its specific gravity. Codlin moth infection amounted to about 5 per cent. Fruit fly did serious damage both to peaches and pears, all the late varieties suffering a great deal.

The Antistia bug appeared late in the season, and attacked the peaches.

All the William pears were exported to England, but no results are to hand as yet. The rest of the crops were marketed locally, and sold out of hand.

A demonstration of dynamite ploughing was given in the orchards, which was largely attended. The results were, however, negative, owing chiefly to the moist condition of the subsoil, which was a heavy clay. Two acres of ground were most successfully cleared of stumps with dynamite.

On the whole the fruit crop was exceedingly small, which was attributable to the unfavourable weather.

The olives imported from California two years back are making good growth. One came into bloom, but set no fruit.

Fodder.

About eighteen tons of oat-hay and a few tons of lucerne were cropped for animal rations.

Amongst the many distinguished persons who visited the Estate was Dr. Solf, the German Colonial Secretary. Dr. Solf was very pleased with the Sweet Wines, and purchased a sixty gallon cask. This cask it was afterwards decided to present to him, and figures as a gratis issue.

Besides directing the management of the Estate, judging of wines was undertaken at two Shows, vineyards were inspected, and advice was given in the manipulation and making of wines. Much attention has also been given to the ozonisation of wines. Samples of wines were submitted for treatment, with very favourable results; the effect in the highly tanninised wines being most remarkable, rendering them soft and palatable.

The expenditure is somewhat higher than in previous years, owing to the installation of pumping plant and the laying of extra piping.

T. L. WATERMEYER,

Manager.

Groot Constantia.

22nd April, 1913.

The Secretary for Agriculture,
Department of Agriculture, Pretoria.

GOVERNMENT FARM, GROOT CONSTANTIA—STATEMENT RE.

Farm or Station.	No. of Draught Animals on Farm.	Other Live Stock.	Average No. Labourers.	Total No. of Acres.	Total No. Acres Cultivated.	No. of Experimental Plots laid out.
Government Farm, Groot Constantia..	7	8 Pigs.	15	297	233	6

[U.G. 47—'13.]

RECEIPTS AND EXPENDITURE.

GOVERNMENT WINE FARM. GROOT CONSTANTIA, FINANCIAL YEAR 1912-13.

RECEIPTS.				EXPENDITURE.			
		£	s. d.		£	s. d.	
Sales of Wine .. ..	..	2,138	6 3	<i>Administrative Charges :</i>			£ s. d.
" Fruit .. ..	..	..	..	Salaries .. ..	..	..	400 0 0
" Vine Cuttings .. ..	..	..	182 5 10	Rations for Staff and Students .. ..	..	..	133 2 10
" Acorns .. ..	..	..	168 18 9	Commission to Agents on Wine Sales .. ..	..	..	46 3 0
" Wood .. ..	..	..	22 17 0				
Students' Fees .. ..	..	..	13 16 10	<i>General Maintenance :</i>			
	..	..	28 6 8	Wages .. ..	..	..	787 13 5
	..	..	2,554 11 4	Working Expenses .. ..	..	..	775 2 3
<i>Free Issues :</i>							1,562 15 8
Trades Commissioner .. ..	..	..	7 9 0				
Porter Reformatory, Tokai .. ..	..	..	16 3 0				
Paarl Oenological Institute .. ..	..	..	1 17 6				
Dr. Solf, German Colonial Secretary	18 8 0				
			43 17 6				
Total Receipts	£2,598 8 10	Total Expenditure	£2,142 1 6

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PLATE NO. 1.
DIVISION OF ENTOMOLOGY.
HEAD OFFICE, 228 WESSEL STREET, PRETORIA



PLATE NO. 2.
DIVISION OF ENTOMOLOGY.
INTERIOR OF INSECTARY, HEAD OFFICE, PRETORIA.

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UNIVERSITY OF ILLINOIS



PLATE No. 2.
DIVISION OF ENTOMOLOGY.
ENTOMOLOGICAL STATION, ROSEBANK, CAPE PROVINCE.
Exterior View.



PLATE No. 2.
DIVISION OF ENTOMOLOGY.
ENTOMOLOGICAL STATION, ROSEBANK, CAPE PROVINCE.
Cour yard of Laboratory.

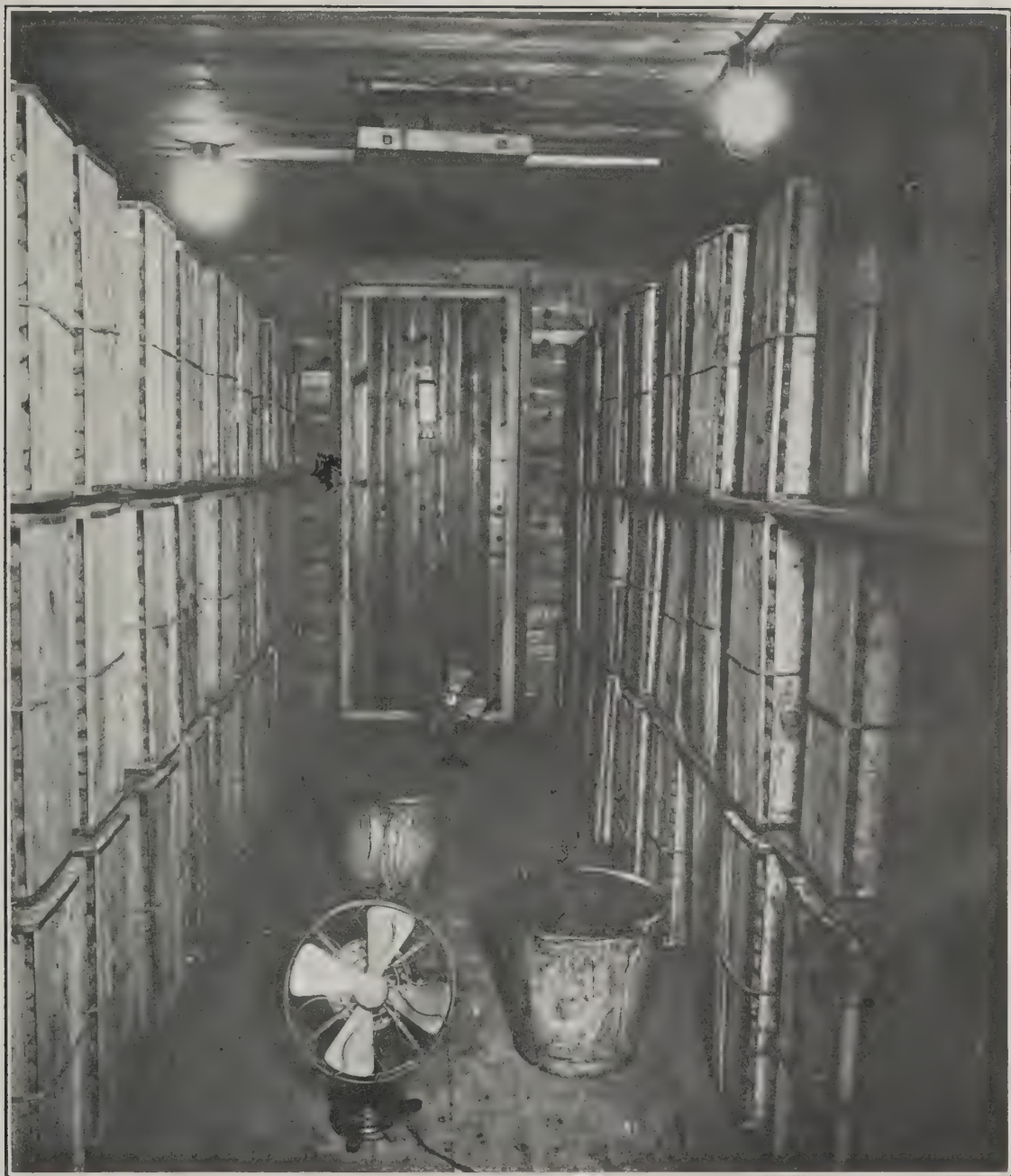


PLATE No. 3.

DIVISION OF ENTOMOLOGY.

POTATO INSPECTION, CAPE TOWN, CAPE PROVINCE.

Interior of formaldehyde fumigation chamber, showing consignment of potatoes arranged for treatment.

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PLATE No. 4.
DIVISION OF ENTOMOLOGY.
PLANT INSPECTION, PORT ELIZABETH, CAPE PROVINCE.
Interior of cyanide fumigation chamber. Inspecting and arranging fruit-tree stocks for treatment.



PLATE No. 4.
DIVISION OF ENTOMOLOGY.
PLANT INSPECTION, PORT ELIZABETH, CAPE PROVINCE.
Exterior view, cyanide fumigation chamber.



PLATE No. 5.
DIVISION OF ENTOMOLOGY.
POTATO INSPECTION, PORT ELIZABETH, CAPE PROVINCE.
Examining and sorting imported potatoes.

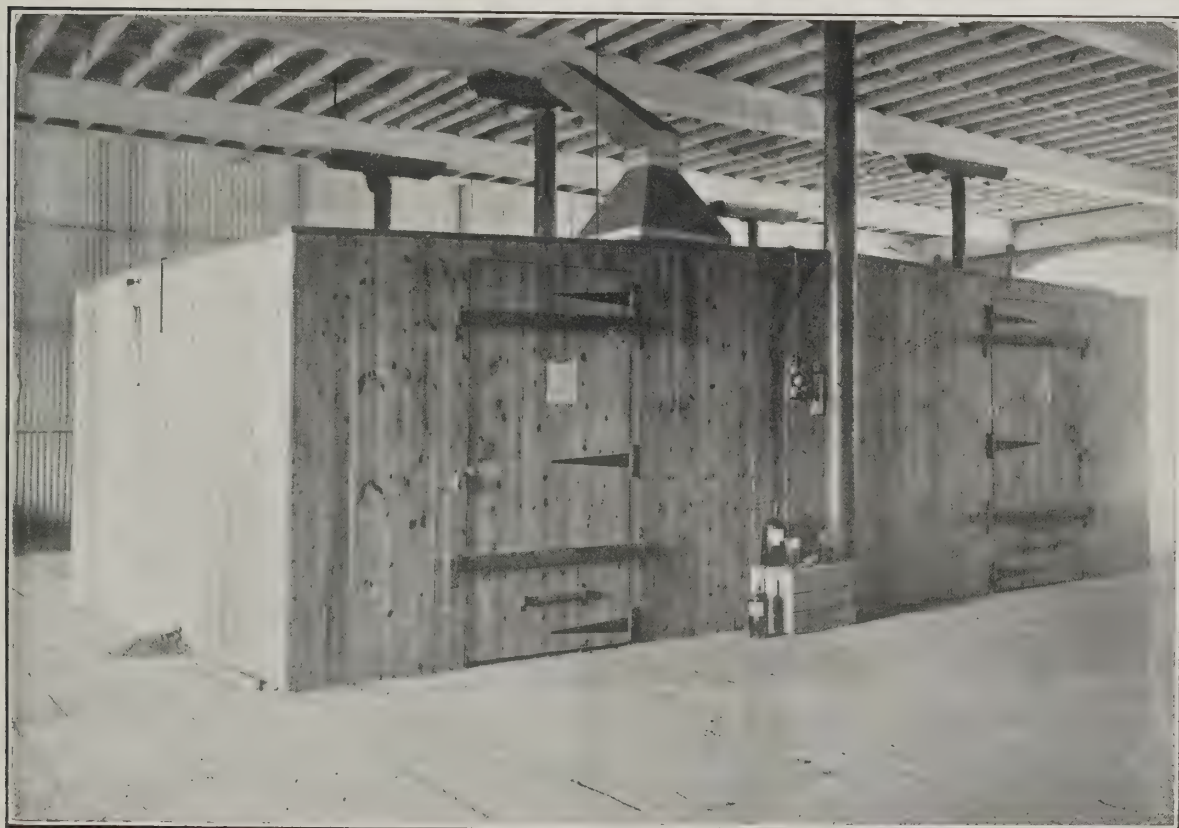


PLATE No. 5.
DIVISION OF ENTOMOLOGY.
POTATO INSPECTION, PORT ELIZABETH, CAPE PROVINCE.
Exterior view, formaldehyde fumigation chambers.

APPENDIX XIII.

DIVISION OF ENTOMOLOGY, ANNUAL REPORT, 1912-1913.

Department of Agriculture, Pretoria,
8th July, 1913.

SECRETARY FOR AGRICULTURE,

I have the honour to report as follows for the period January 1st, 1912 to March 31st, 1913, with respect to the Division of Entomology:—

DUTIES OF DIVISION.

The duties of the Division comprise, in addition to the investigation and dissemination of information on insect problems, the administration of regulations concerning 1, plant imports, 2, inspection of nurseries, and 3, restrictions on traffic in plants and fruits. This statement is desirable inasmuch as in most countries these other duties are assigned to a special division or divisions.

The Division has twice transferred its main offices during the period under review, and has now become located, permanently it is hoped, in a dwelling house on Wessels Street near Church Street, Arcadia. The position is convenient to the new Union Buildings.

STAFF.

The staff of the Division remains inadequate for the satisfactory performance of the miscellaneous duties expected of it, and the statements made in my last report in this connection still hold good. Moreover, the inspection work at the ports continues to be entrusted to officers who have no technical knowledge of insects and plant diseases. These several defects in the Division's organisation have been discussed at length in a departmental minute, and there is nothing to be gained by further reference to them here.

The clerical staff was augmented early in the period under review by one first class clerk at Pretoria headquarters, but otherwise remains of the strength shown by the previous annual report. The branches at Pietermaritzburg, Bloemfontein and Grahamstown have been closed by the permanent transfer of the officers formerly stationed there to Pretoria and Cape Town, and this step has assisted materially in enabling the Division to cope with its routine work. One field station for a special investigation has been opened, and will be referred to later in the report. The permanent technical and general staff, and the headquarters and special work of each member is now as follows:—

HEADQUARTERS AT PRETORIA.

Chas. P. Lounsbury, Chief of Division.

Claude Fuller, Assistant Chief. In charge of enquiries concerning insects and of local investigations.

C. P. van der Merwe, Entomologist. In charge of nursery inspection.

A. Kelly, Assistant to Entomologist, Senior Assistant for nursery inspection.

F. Thomsen, Plant Inspector, 1st Grade. In charge of collections, breeding, work, etc.

J. Hodgson, Plant Inspector, 2nd Grade. In charge of Pernicious Scale inspections and of locust records, and general assistant for nursery inspection.

B. Delpont, Plant Inspector, 3rd Grade. Local inspector to enforce special Pernicious Scale regulations and junior assistant for nursery inspection.

Two Assistant Entomologists also show against the Votes of the Division. The two posts are held open for C. K. Brain and D. Gunn, both of whom are now studying abroad. Mr. Brain is expected to return in July, 1914, and Mr. Gunn in September of the present year.

[U.G. 47—'13.]

HEADQUARTERS AT CAPE TOWN.

C. W. Mally, Entomologist (Cape). In charge of miscellaneous work in Cape Province.

—, Assistant Entomologist (1)*, Special investigations.

S. M. Wood, Assistant to Entomologist (2)†. Miscellaneous duties.

—, Plant Inspector, 3rd Grade (3)‡. Inspector of plants, fruit, potatoes, etc., at port of Cape Town.

* (1) Post vacated in January 1911 by resignation of T. F. Dreyer. Still open but candidate now under consideration.

† (2) Present incumbent appointed as from April 1st, 1913. Occupied by W. B. Manning prior to September, 1912, and vacant from September to April.

‡ (3) Officer supervised by Cape Entomologist. Post filled by S. M. Wood during period of this report but vacated March 31st, 1913 and vacant at time of reporting.

FIELD STATION AT NEW HANOVER, NATAL.

C. B. Hardenberg, Entomologist. Special investigation of insects injurious to wattle trees.

PORT PLANT INSPECTORS.

At Johannesburg.—C. W. Cloete, Plant Inspector, 2nd Grade.

At Durban.—C. W. Morrison, Plant Inspector, 2nd Grade.

At East London.—J. L. King, Plant Inspector, 2nd Grade.

At Port Elizabeth.—G. Walter, Plant Inspector, 2nd Grade.

These officers are supervised directly from Pretoria. They have charge of the inspection and precautionary treatment of the plants, potatoes and fruits cleared through the Customs at their respective ports of entry. Those at Johannesburg, East London, and Port Elizabeth are junior inspectors of the nurseries in the vicinity of their stations, and this phase of his work is of particular importance in the case of the Johannesburg officer, who also has the special duty of guarding against wrongful removals of pip fruits from Johannesburg. The officers at Durban and Port Elizabeth incidentally inspect consignments of export fruit for the Division of Horticulture.

Expenditure.—The appropriations for the Division in the financial year 1912-1913, and the expenditures actually entered against the several items were as follows:—

Vote No.	Service.	Appropriation	Expenditure.
L.	Salaries, Wages and Allowances	£8,324	£7,219 7 5
2 67	Transport and Travelling	1,800	1,348 10 0
3 68	Grant in Aid (Imperial Entomological Commission)	150	—
4 69	Locust Destruction	1,000	141 14 8
5 70	Eradication of Pernicious Scale : Labour	2,400	265 7 4
5 71	Eradication of Pernicious Scale : Compensation, equipment and materials... ..	4,000	26 7 9
6 72	Materials for sale to public	150	9 4 0
6 73	Labour, equipment and materials for eradication of pests under Agricultural Pests Acts, 1911 (other than Pernicious Scale)	1,930	111 10 1
6 74	Potato and Plant Inspection at Ports, including labour, rent and railage	3,785	2,277 4 11
6 75	Educational and Demonstrational Work and other expenses in connection with plant and fruit pests	150	26 7 9
7 76	Rosebank Experiment Station	450	68 10 8
8 77	Incidental expenses	500	151 14 2

The vote for the destruction of locusts was to enable the Division to act promptly in making a start towards getting locusts destroyed should an emergency occur. Fortunately little of the money was needed, and the slight expenditure shown was all in connection with the work of previous years. The projected ex-

penditure for Pernicious Scale destruction was not made, the Government deciding to abandon the work which it had taken up in the previous year. The decision not to attempt the extermination or suppression of the Pernicious Scale also had the effect of preventing heavy expenditure with respect to any other pest, and, as it has happened, no need arose during the period for a campaign against any new pest. The apparent saving on the vote for potato and plant inspection at the ports is largely due to the payment of heavy items of expenditure from Public Works votes which it was expected would have to be entered against this vote. The saving under salaries is ascribable to two officers being provided for who are on leave without salary to study abroad and to delay in filling posts that became vacated; while the saving on the remaining votes is principally accountable for by the Division not having got into a degree of working order that was desirable before certain contemplated expenditures were made. The Division has been much in need of expensive equipment for the technical features of its duties, and it would have been conducting investigative, demonstrational, and educational work that would have required the surplus on the votes for travelling, for educational work, and for incidentals if the burden of office and inspection duties had not prevented.

Revenue.—The gross revenue (unaudited) of the Division in the financial year 1912-1913 from fees levied in accordance with Government regulations was as follows:—

Fumigation of imported potatoes:

Cape Town	£1,743	11	6
Durban	1,510	9	0
Port Elizabeth... ..	890	18	6
East London... ..	884	5	0
Johannesburg	11	4	0
	<hr/>		
		5,040	8 0
Fumigation of imported plants ...		114	17 6
Fumigation of domestic plants		23	1 6
Inspection of quarantined nurseries		20	0 0
Sales of Vedalia ladybirds		4	4 0
	<hr/>		
		£5,202	11 0

There was further collected:—

For nurserymen's labels sold at cost	£11	12	5
For stores sold under authority	14	13	0

The fees for fumigation are collected from the public through the agency of the Customs Department in the case of potatoes and of cargo consignments of plants, and through the agency of the Railway and Postal Departments in the case of domestic plants and postal consignments. The Railway makes a slight charge for its service, which is not given consideration in the above statement.

Nursery Inspection.—The prevention of the dissemination of pests with nursery stock is being given much greater attention by the Division than was given by all the entomological divisions of the several colonies prior to Union, the large increase in work in this direction is one of the chief reasons why so little time is now available for insect investigations. The Union legislation in respect to traffic in plants admits of much more effective control over nurseries than was practicable under any of the colonial laws, and the highly unfortunate dissemination of the notorious Pernicious Scale which went on undetected for several years in two of the colonies emphasises the imperative need of closer control than was the practice before Union. The Division is now doing its best to give adequate attention to the nurseries, notwithstanding that the Government neglects to take cognizance of the great increase in the work along these lines by providing additional staff to cope with it. There should be a section of the Division devoted exclusively to plant traffic matters, but it is impracticable, with the small staff at present authorized, to arrange for one; in consequence nursery affairs have to be dealt with in common with other matters, and have to receive far more personal attention from the Chief of the Division than should need to be the case.

The plant nurseries of the Union, for the most part, are very small, and hardly deserving of the title of nursery. Many of them are merely backyard affairs run by gardeners who go out to work by the day. Not a few would be ignored by the Division as not justifying the expense of registration and inspection were it not that the occupiers of the larger nurseries almost without exception show irritation to an extraordinary degree if they learn of anyone selling any nursery stock whatever who is not under the same supervision as themselves. Success in nursery con-

trol depends largely on winning and maintaining the goodwill of the nurserymen and in convincing them that any restrictive measures are applied on one and all alike, and for this reason the smallest nursery is treated as if the danger of its spreading pests were as great as in the case of the largest.

The total number of nurseries registered in the period under review is 388. Of this number, 64 are small places at which under 2,000 plants of all kinds are stocked. 74, all in south-western districts of the Cape, are devoted exclusively to grafted vines, and seven, all in Natal, deal only in carnation plants. 35 are maintained by the Government Forest Department, and 27 are managed in connection with public parks or gardens. Three are run by the Railway Department, and from these and ten others no sales to the general public are supposed to be made. Fruit trees are grown in 153 nurseries, about three-fifths of which are in the Cape Province. The distribution amongst the provinces is:—

Cape	239
Transvaal	97
Natal	34
Orange Free State	18
Total... ..	388

Of the Cape nurseries, 181 are in the western half of the province, and 58 in the eastern. The Paarl division leads with 69 registrations, the Cape is second with 42, and Johannesburg third with 39.

The acreage actually under nursery stock is estimated to total to 1,281. The small size of most of the nurseries may be gathered from the following table:

Nurseries half an acre or under in extent	148
„ one-half to three acres in extent	170
„ three to ten acres in extent	55
„ ten to twenty-five acres in extent	7
„ twenty-five to one hundred acres in extent	6
„ one hundred acres and above in extent	2

As a further step towards recording data that will be useful in determining the progress made in the nursery trade, the following figures have been compiled from information supplied by nurserymen with respect to their stock, and from the observation of the inspectors. The figures should be taken as roughly approximate only; it is probable that those for greenhouse plants are too low, while those for other classes are too high.

Fruit trees	2,657,500
Vines... ..	5,026,500
Forest trees	17,647,200
Roses and ornamental shrubs, etc.	1,217,500
Greenhouse plants... ..	350,000

It is a pleasure to record that no nursery in the country is known to be infested with Pernicious (San Jose) Scale. It was found in one nursery in Pretoria, and one in Pietermaritzburg in 1911, as recorded in my previous report. The nursery premises in Pretoria were denuded of the food-plants of the scale, and the only nursery stock now grown there is greenhouse plants. The Pietermaritzburg premises appear never to have been much infested, and the burning out measures taken by the occupier at his own expense seem to have eradicated it. A Government inspector personally supervised the fumigation of the plants sent out from this and neighbouring nurseries in the 1912 selling season, and spent the rest of his time for several months in a painstaking but fruitless search for the pest. Still another inspection was made when summer came on.

Nurserymen were given notice that quarantines would be imposed on account of:

- Pernicious Scale (*Aspidiotus perniciosus*).
- Grey Scale (*Aspidiotus africanus*).
- Red Scale (*Chrysomphalus aurantii*).
- Ross Scale (*Chrysomphalus rossi*).
- Round Purple Scale (*Chrysomphalus aonidum*).
- Mussel Purple Scale (*Lepidosaphes beckii*).
- Long Scale (*Lepidosaphes gloveri*).
- White Peach Scale (*Aulacaspis pentagona*).
- Araucaria Scale (*Eriococcus araucariae*), and
- Woolly Aphis (*Schizoneura lanigera*).

All of these pests, with the possible exception of the last, depend chiefly on nursery stock for their initial introduction into South African orchards. The Red Scale is by far the most widespread of the several scales, and I do not think any nursery, in which citrus stock is kept in quantity, was found by the inspectors to be absolutely free of this at present most troublesome of all South African scale insects. In a number of leading nurseries, however, very little indeed was found, and that little was at once dealt with on drastic lines. The Round Purple and Mussel Scales are bad pests in some parts of the country, and there is excellent evidence that they are capable of giving great trouble over a far wider area. The former species, most unfortunately, has become common as a palm pest, and its eradication from floral establishments is giving the Division immense trouble. The Ross Scale has even greater potentialities as a pest, and the Division is strenuously endeavouring to prevent its being carried into fresh pastures. It has for years had a firm hold in Pretoria and along the Witwatersrand, and is just getting well started in one of the eastern towns of the Cape Province. The plants commonly used as hedges in the country happen to be specially pestered by it, and it is to be feared that the magnificent stretches of Australian Myrtle (*Leptospermum*) that help to enhance the natural beauties of the Cape Peninsula will suffer very severely if it becomes established in that part of the Union where, up to this time, it has not been found at all. The Pustular Scale of the oak (*Asterolecanium variolosum*) is another as yet little known insect which the nursery control service is holding back to the benefit of the country at large. It attacks the oak only, but it disfigures this highly important shade and plantation tree to such an extent that its presence is a distinct public misfortune. Johannesburg district and the Cape Peninsula are the only parts of the country now known to be infested, but other parts have undoubtedly received it from Johannesburg. It is of European origin, and probably was introduced to Johannesburg shortly after the war. The Chaff Scale (*Parlatoria pergandii*) and *Aspidiotus dictyospermi* are other potential pests which have been found in the course of nursery inspection. Both are partial to citrus trees, and the latter, at the present time, is said to be devastating orange groves in Spain.

Quarantines have only been imposed on nurseries when the conditions with respect to pests were very bad or when the occupier has failed to exterminate infestations after his attention had been specially drawn to them. Twenty-seven nurseries were quarantined in whole or in part during the financial year 1912-1913, and of these nineteen have been released. Of the twenty-seven the number in the Cape Province was sixteen, in the Transvaal seven, and in Natal four. At the time of writing, July 1st, there are twenty-two quarantines in force, eleven in the Cape, nine in the Transvaal, and two in Natal. A list of current quarantines, giving the reasons for the imposition of each has been sent to the *Agricultural Journal* for publication. Under the new Act a fee of £1 has to be paid by a nurseryman with respect to any inspection made to get a quarantine removed. In two cases last year, a second fee had to be paid as the conditions disclosed by the first inspection were not considered satisfactory. The charging of fees in this connection has a decidedly salutary effect in the case of small nurseries, while the temporary suspension of sales alone is ample inducement to make the occupiers of the larger nurseries do their best to abolish the causes for quarantines in their cases. One nurseryman who was quarantined during the year stated that his loss in sales amounted to £40 a day. A quarantine is always made known to the magistrate of the district in which the nursery is situated, and the railway officials at the station from which stock from there is ordinarily despatched are notified not to accept consignments. The magistrates usually, if not always, advise the police.

Plant Import Regulations.—An officer of the Division is stationed at each of the four principal seaports of the Union; and except that plants may enter at Delagoa Bay for inspection at Pretoria or Johannesburg the introduction of plants from overseas is confined to arrivals through these ports. The plants are ordinarily fully dealt with by the plant inspector at the sea port, but the examination and precautionary fumigation may be deferred until the arrival at the destination station in the case of any consignment for Johannesburg and Pretoria which is fully covered by an introduction permit. Actual plants are admitted only under permit, but bulbs, fruit, potatoes, seeds (excepting cotton), are admitted without this formality. During the financial year 1912-1913, the number of permits issued was 632. Permits are made available for six months only, other than in very special cases, and as most plants covered by permits are afterwards introduced,

it follows that the permits reflect the actual imports. The permits issued during the year were for plants as follows:—

Stocks for budding or grafting:	
Blight-proof apple	273,100
Pear	55,400
Other kinds	18,350
Fruit and nut trees... ..	421
Small-fruit plants (strawberries, blackberries, currants, gooseberries, etc.)	963
Vines	88
Roses	2,922
Palms	18,823
Carnations	17,257
Chrysanthemums	4,581
Other plants, including ornamental shrubs, miscellaneous greenhouse plants and perennial herbs	12,535

Permits are granted without restriction as to number for the few kinds of stocks for budding or grafting that are still admitted, and also without restriction as to number for palms and perennial herbaceous plants, but are given for ten of a variety only in the case of trees, shrubs, vines, etc., and then only, in the case of fruit plants, vines, and roses, providing that the variety is not procurable from nurserymen in the country. The Act (Agricultural Pests Act), specially prohibits the introduction of acacia, eucalyptus and coniferous plants; and under the discretionary power vested in the Department, the issue of a permit for any oak or plane tree is invariably declined. The rules, written and unwritten, governing the issue of permits have been and will continue to be adhered to rigidly, as it is felt that departures from the customary procedure, however much they may seem justified in individual cases judged alone, would quickly give rise to a widespread feeling that permits go by favour, which it would be very difficult to controvert. The restrictions are admittedly arbitrary in some respects, but the arbitrariness is practically unavoidable, and it is consistently exercised. These remarks are made because, in the past season, many parties applied in vain for permits to enable them to get delivery of plants, roses in particular, which they, in ignorance of or indifference to the regulations, had ordered from overseas. The restrictions were notified through the leading South African newspapers and through the *Agricultural Journal* and British postal guide and the overseas nurserymen known to do business in South Africa were cautioned by a circular letter, yet the public generally seem to be in virtual ignorance of them, and it is to be feared that many prospective importers of plants still remain to be taught through the medium of unpleasant experience.

One object in publishing the above figures is to draw attention again to the anomaly of fruit tree stocks being admitted. There would be no valid excuse for continuing to admit stocks after sufficient time had elapsed to produce a supply in the country if it were demonstrated that they can be grown in the principal nursery sections. The figures also indicate that there is a large palm trade which might be met with plants propagated in the country. From a pest standpoint, however, it is a regrettable fact that palms from the leading South African centres of production are much more dangerous than palms from the overseas sources.

All woody plants, inclusive of roses, are fumigated on arrival with hydrocyanic acid gas as a precautionary measure against scale insects. It was stated in Parliament during the recent session that the fumigation almost invariably killed the plants. The error of the statement may be deduced from the fact that the practice has been consistently followed in the case of all woody plants introduced from overseas into the Cape Province since 1903. The danger of injuring woody plants by fumigation is much less than that unavoidably associated with exposing them for inspection; and in this connection the plant inspectors are under strict instructions to take the greatest care practicable to minimise all the risks. Many of the faults blamed to the inspection and fumigation are due to improper packing by the consignor, and to rough handling in transit.

Very few of the plants imported during the period under review were found to be infested with pests, if common and unimportant greenhouse insects were excepted. However, *Lepidosaphes ulmi* (Oyster Shell Bark Louse) was found a few times, and once in considerable numbers, and a gross infestation of *Aulacaspis rosae* (Rose Scale), was found on some blackberry plants consigned to a nursery.

Neither of these scale insects are known to occur anywhere in South Africa, and both of them are bad pests which would doubtless thrive here.

Fruit is subjected to inspection, and the fact is of much assistance in preventing the introduction of inferior and poorly graded fruit. As has been the custom for many years, fruit is admitted only after fumigation with hydrocyanic acid gas if it is scale infested more than to a very slight extent; and the handling of the fruit for this purpose, more than the rather stiff fees that have had to be paid for the treatment, influence the importers to try to get clean fruit. A surprise this year was Pernicious (San Jose) Scale in abundance on some lots of Californian pears. The dealers wisely chose to re-ship the objectionable fruit. Another unpleasant surprise for an importer was a gross infection with *Fusicladium* (*Fusicladium*) of 600 barrels of graded Canadian apples that were far from being up to the standard required by the Canadian fruit marks law. The fruit was allowed to enter after fumigation with formaldehyde gas.

Potato Import Regulations.—There is really nothing entomological about the potato import regulations, but they fall to the lot of the Division for administration, in large part because it is convenient to have the plant inspectors of the Division engaged in the work. The report of the Division for 1911 was made to include potato import matters up to the end of the 1911-1912 season. This report therefore need deal only with the financial year 1912-1913.

The incoming potatoes were all sorted in the 1911-1912 season, and all objectionable tubers excluded from entry. Importers protested strongly against this procedure, and as an outcome it was arranged by the Department that sorting be supplanted by fumigation in formaldehyd gas. I was instructed, in early May, that gas generated with permanganate of potash from formaldehyd solution employed at the rate of three pounds to 1,000 cubic feet of enclosed space, was to be used; and that the potatoes were to be exposed, without removing them from their boxes, for four or more hours. These instructions have been faithfully carried out, and every effort made, compatible with them, to have the treatment serve its disinfecting purposes. Special double-walled chambers, provided with ventilation flues and with electrically driven fans to expedite the diffusion of the gas, were erected at the four ports, and were in readiness when the potato import season opened. Supplies of formaldehyd and permanganate were cabled for at once; and it is incidentally illustrative of the difficulty which may be experienced in getting supplies from oversea through the Government channel that these supplies, although delivery by July 1st was urgently requested, did not arrive until the end of the year. Fortunately merchants in the country were able to supply enough for current needs, they somehow or other getting their small stocks renewed from oversea despite the strikes that were said to be delaying the shipping of the Government supplies. About one and a half tons of formaldehyde were used in the season.

The chambers at Cape Town were made about 14 feet square and 8 feet high, and those at the other ports about 12½ feet square. The cases were stacked three or four high, with about three inches of clear space around them, and with two inch by three inch battens between each two tiers. A large free-way was left above the cases, and around the generating vessels in order to allow the gas to spread itself quickly. Potato boxes, it may be useful to mention, are almost invariably made with a wide ventilation space between each two of the slats that compose their sides, and it is expected that the disinfecting gas makes its way through these spaces and thence around every tuber.

The chambers were built with two wide doors, one opposite the other, and the charge of chemicals was usually divided between two large galvanised iron buckets, one placed a little back from each door. The charge consisted of 48 fluid oz. formaldehyd solution (nominally 40 per cent.) and 24 avoird. oz. of permanganate of potash crystals. The crystals were placed in the bucket, and the liquid added. No trouble was experienced with boiling over, and no polymerization of the formaldehyd was observed. In about half of the treatments, the exposure was overnight or about fourteen hours, and in the rest it was generally four to five hours. The temperature within the chambers at the time of fumigation averaged lowest at Cape Town, but even there was above 60 deg. F. during about ninety per cent. of the exposures. All the chambers are located close to the sea front, and hence where the humidity is relatively high. The only complaints that the fumigation damaged the potatoes for seed purposes came from a few farmers on the Cape Flats (Cape Province), and an enquiry into these complaints by the Cape Entomologist led to the conclusion that the treatment was not responsible for the effects attributed to it.

The total imports for the season (July, 1912 to March, 1913), as shown by the returns of the several plant inspectors were:—

Cape Town	...	...	68,896	Packages aggregating	4,758,285 lbs.
Durban	...	...	58,311	"	4,617,452 "
Port Elizabeth	...	...	35,629	"	2,334,892 "
East London	...	...	35,311	"	2,479,038 "
Mossel Bay	...	...	3,380	"	240,000 "
Johannesburg (<i>via</i> Delagoa Bay)	...	...	224	"	32,995 "
Totals	...	...	201,751	Packages aggregating	14,462,662 lbs.

The particulars of the imports through Mossel Bay were not recorded. The division of the imports between table and seed potatoes at the other ports, as shown by the markings on the packages, was as follows:—

	Table Potatoes.	Seed Potatoes.
Cape Town	1,573,330 lbs.	3,184,955 lbs.
Durban	1,296,408 "	3,321,044 "
Port Elizabeth	245,094 "	2,089,798 "
East London	153,668 "	2,325,370 "
Johannesburg	32,995 "	—
	3,101,495 lbs.	10,921,167 lbs.

The division according to the country of origin was:—

Great Britain	2,502,289 lbs.
France	10,385,337 "
Germany	794,686 "
Holland	244,662 "
Other countries	295,688 "

The potatoes from "other countries" were chiefly table potatoes from British East Africa.

The firm which indents most largely for seed potatoes is of the opinion that South African farmers plant the Early Rose and Up-to-date varieties altogether too much to the exclusion of other varieties. The following table showing the quantity of some of the principal varieties imported through the several ports during the season, should be of interest in this connection.

Variety.	Cape Town lbs.	Durban. lbs.	Port Elizab th. lbs.	East London. lbs.
Early Rose	4,170,639	2,606,486	1,460,948	989,459
Up-to-Date	453,942	1,244,802	779,037	1,240,913
Factor	67,848	52,828	8,300	6,130
Epicure	4,620	10,000	23,010	4,950
John Bull	—	—	17,490	3,630
Northern Star	1,320	13,805	10,220	—
King Edward VII.	—	23,820	—	—
Miscellaneous or unnamed...	59,616	665,711	35,887	233,956

A large share of the potatoes recorded as "miscellaneous or unnamed" in the case of Durban is made up of table potatoes from British East Africa; but the item also includes Eldorado 50,000 lbs., President 47,120 lbs., Flour Ball 10,000 lbs., and British Queen 29,300 lbs. The East London entry under the same heading also includes unnamed British East Africa table potatoes, and in addition includes President 90,858 lbs., Prosperity 30,600 lbs., German Blue 16,104 lbs., King of Earliest 16,500 lbs., and Five Towers 26,202 lbs.

The Department naturally fears the introduction of the notorious Black Scab or Warty Disease (*Synchytrium endobioticum*) with importations of potatoes from Europe; and as a precautionary measure with respect to this disease it is laid down in the regulations regarding the introduction of potatoes that any consignment admitted must be covered by prescribed documents as evidence that the potatoes were not produced near any source of infection. The documentary requirements were the same in the period under review as previously; and they were made notified at the beginning of the season by circular advices to all known interested parties and by notices in the *Agricultural Journal*, *Government Gazette*, and the chief newspapers of the country, yet quite a number of consignments arrived without the documents, and many more with defective documents. It is my duty to enforce the regulations whether I think them desirable or otherwise, and such consignments were therefore detained, in many cases to the extreme annoyance and indignation of the consignee, until the faults were corrected. Some detained consignments were abandoned, and some were sold to outgoing vessels. In one case a detained consignment was actually found to have come from a locality where the Black Scab was known to the authorities to have occurred. It had been shipped in ignorance of the regulations.

Five per cent. of the packages in every consignment were opened for inspection, and the full contents of these packages, or at least of five packages in the case of large consignments when there was a great rush of work, were sorted to determine the condition of the consignment with respect to decays and disease blemishes. From the inspectors' reports the following table, showing the average percentage of affected tubers in a consignment was compiled.

Average percentage of tubers affected with :	Cape Town.	Durban.	P. Elizabeth.	E. London.
Fusarium and other decays	4.74	4.66	3.00	5.11
Oospora and other scabs ...	.20	.80	.78	1.85
Rhizoctonia ... ..	.03	—	.31	2.26
Insect tunnelings ... ..	.08	.17	1.54	5.40
Total of all four classes of troubles	5.05	5.63	5.63	14.62

The inspector at East London is far more particular than those at the other ports, he having many tubers classed as affected, which the other inspectors would class as clean. Girls sort for the inspection at this port, but men at the others. The figures show that, as a whole, the potatoes imported were remarkably free of disease and blemishes which one could suspect to be caused by disease. The conditions with respect to Scab and Rhizoctonia were vastly more satisfactory than in the previous season.

The Government reserved the right to exclude potatoes in which any specially feared disease may be found; and the public, at the beginning of the period reviewed was notified that this action would be taken in case Black Scab was found, and also, probably, in case any "pathological bacterial trouble" was found. As it happened no bacterial trouble of importance to the developing plant was found amongst the consignments examined in 1911-1912 season, and consignees were quite unprepared for any being found in the new season. The shock was great then when in the middle of September a succession of consignments was found infected with *Bacillus phytophthorus*, and in consequence denied admittance into the Union on the advice of the plant pathologist. For a time the trade was thrown into disorder, for many dealers had already sold under contract supplies which they were expecting. Later in the season the Secretary gave instructions to exclude only packages in which the disease was actually found, but in practice this concession was of little advantage. In order to guard effectively against the mistake of rejecting for any decay superficially resembling but distinct from that caused by pathogenic bacteria, suspected consignments were held in detention at the port while a representative case, almost always one which had not been opened or tampered with in any way, was sent by passenger train to Pretoria for a microscopic study of diseased tubers in the Division of Plant Pathology. Consignees chafed much at the delay thus caused.

Altogether there were rejected for *Bacillus phytophthorus* or other pathogenic bacterial disease a total of 3,472 cases, aggregating 258,786 lbs. of potatoes from 28 consignments. Most of the rejected potatoes were destroyed by order of the owners, but some were reshipped. No account was taken by the plant inspectors of consignments which because of their bad condition, were abandoned in whole or in part by consignees without any effort being made to get them admitted; nor was account taken of packages debarred by order of port health officers. Doubtless a large proportion of the packages which arrived in a badly decayed state, and which did not reach the plant inspector were infected with pathogenic bacterial diseases; and the total rejection for the diseases would undoubtedly have amounted to 1,000 to 1,500 cases more than it did if it had included these packages. The health officer at Durban condemned 746 cases out of seven consignments that arrived by one vessel in September. Many of the cases rejected by the plant inspectors contained a high percentage of decayed tubers, but the greater part of the cases would have been readily saleable if they had been admitted.

A uniform charge of 6d. per package containing 100 lbs. or less, and of 1s. per package containing over 100 lbs., was levied for the fumigation with formaldehyd. The fees from this source have been given under "Revenue" in a preceding paragraph. Importers have demurred very little against the charge, their general attitude towards a fixed assessment being in striking contrast to their attitude in regard to the uncertain factor of rejection.

Codling Moth Regulations.—The regulations prohibiting the removal of apples, pears, and quinces into certain areas of the Union, as a check on the introduction and spread therein of the Codling Moth, have been working fairly smoothly throughout the period reviewed. No contraventions of serious importance have been detected; but chiefly through the vigilance of railway staffs at destination stations a considerable number of small consignments of wrongfully removed fruit, generally of one or two boxes of apples or pears, have been stopped in transit. The acceptance of any such consignments for conveyance is contrary to frequently repeated Railway instructions; and the instances that come to the notice of the Division are systematically reported to the General Manager of Railways, with a request that he have action taken to guard against a repetition of the offence at the particular stations concerned. The fruit is destroyed, returned to the sender, or otherwise disposed of outside of the protected area, as the Railway Divisional Superintendent may direct. The sender is formally reported by this Division to the magistrate of the district in which he is resident, and it is requested that action be taken against him because of the infringement. The party often escapes with an admonishment if it is his first offence, and it is reasonably clear that he was ignorant of the restriction he violated, but sometimes a fine is inflicted. Should the consignment have been delivered, or known to have been ordered, similar steps are taken to bring the receiver to account. The regulations require that fruit be shipped under the name of the fruit, not simply as fruit. One Johannesburg coolie dealer was found to have succeeded in smuggling apples into a closed area by shipping them as other fruit. His little experience cost him £10 in the police court. Two lady school teachers also got themselves into very embarrassing circumstances by sending a couple of cases of apples to friends in a closed area through the trick of consigning the fruit as pineapples.

A large section in the east of the Cape Province was withdrawn from the closed area towards the end of the period reviewed. The protected area then came to consist of two portions, one comprising the districts of Alexandria, Bathurst, and Peddie, and the other of the districts of Barkly East and Komgha and the Transkeian territories. The alteration had become desirable by reason of the extensive occurrence of the Codling Moth within the portion of the area with respect to which the restrictions were withdrawn. The pest was already in the area when the regulations were first applied, in 1905, and its present greatly extended range is probably chiefly due to spread from within. The pest is not yet known in the district of East London, but this district was withdrawn from the area because of the small extent to which apples and pears are there grown, and the fact that the city of East London would otherwise be cut off from obtaining apples and pears from the districts that would naturally serve it. The port of East London is now open to apples and pears from anywhere after having been closed to oversea countries and the chief deciduous fruit sections of South Africa for nearly eight years.

Transvaal districts in the closed area would be menaced principally by fruit from Johannesburg, most of the fruit for outlying towns being purchased there, were it not for the restrictions. On this account the plant inspector at Johannes-

burg is charged with keeping a close supervision over all consignments that are offered for conveyance at the several stations in the city, and owing to his exertions the forwarding of any prohibited fruit from the city has been a rare occurrence in the period reviewed.

Plant Removal Regulations.—There is no doubt whatever that in the not distant past pests which depend for their rapid dissemination chiefly upon being carried with plants were spread about South Africa quite as much by plants and plant cuttings from private gardens as by nursery stock. The relative importance of private plants as the disseminators has diminished with the development and extension of nurseries, and at the present time I regard it as slight with respect to fruit tree pests; but private plants still constitute a factor in this country, which should not be ignored. To guard as effectively against the removal of infected plants from private places as is now being done in the case of nurseries would necessitate a degree of supervision over what a person might take with him on a journey that would not be tolerated by South Africans, and which aside from the annoyance and inconvenience to travellers would cost more to apply than would be commensurate with the probable advantages. Hence some dissemination of pests with plants must remain unavoidable, and the Government should regard its measures as retardatory at the best. With this comprehension of the position before it, the Department refrained from demanding the inspection of any plant which a person may take with him from one place to another; but it has secured legislation requiring that plants (other than certified nursery stock and plants covered by special permits, and with certain exceptions such as vegetable and flower transplants), which are consigned by rail or post from any place be submitted, before delivery, to a plant inspector for examination. The plant inspector may return the plants to the sender if he finds them diseased; and in the case of most fruit trees it is his duty to fumigate them as a precautionary measure, and to assess a fee of 2s. 6d. or more for this service. Any additional expense for carriage must be borne by the consignor or consignee; and as plant inspectors are stationed only at six places in the Union, it follows that this safeguard against the spread of pests may cost a party rather highly, and may involve a delay of several days in the delivery of the plants. I favour the imposition of the precaution on general principles; but think that I may be able in the course of a season or two to recommend that it be relaxed with respect to certain classes of plants.

Railway and Postal officials are under instructions to see that plants received by them for despatch are referred to a plant inspector when the regulations specify this course. It is probable that the instructions were, through ignorance or indifference, disregarded in numerous instances during the past year; but as time goes on it is to be expected that they will be observed more and more scrupulously, since all cases of negligence that come to the notice of this Division will be reported to the General Manager of Railways or the Postmaster-General, as the case may be. Steps to keep the requirements prominently before the notice of the officials will also be taken.

The inspection was instrumental last winter in preventing two rather large private consignments of oak trees infested with the Pustular Oak Scale (discussed in a preceding paragraph), from being despatched from Johannesburg to distant centres; and the finding of the ordinary Red Scale on fruit trees, roses and vines was quite a common occurrence.

Special restrictions exist on the introduction of particular kinds of plants into certain areas of the Union, and the requirement that private sendings of plants be passed by a plant inspector is of assistance in the enforcement of the special provisions. Vines may not lawfully be sent to other parts of the Union from a large area in the east of the Cape Province, or from Natal, or from Barberton district in the Transvaal, and vines may not legally be introduced into a large section in the south-west of the Cape Province; and similar provisions are in force with respect to mango plants.

A special check on the spread of Pernicious Scale is provided for in a proclamation, published in July of the past year, restricting the removal to any other part of the Union of plants from the area comprised within six miles of the centre of Pretoria. Removals are allowed only under permission from this Division, and the permission is withheld if the plants do not appear to be free of insect pests. Nursery Plants, alike with private plants, are specially inspected, and all woody plants deemed to be susceptible to Pernicious Scale are fumigated as an additional precaution. A large share of the time of one plant inspector is consumed in enforcing these provisions. The proclamation referred to further provides that

without special permission from the Department no plant not specially excepted shall be removed from any premises where Pernicious Scale is known to occur.

Regulations relative to Bees.—The Agricultural Pests Act, 1911, restricts to the Government the right to introduce bees from overseas. None were introduced during the period under discussion. The Act prescribes a total prohibition on honey, and in this respect it follows legislation previously on the statute books of the several colonies. Small consignments are occasionally presented for admittance, but are constantly debarred. Beeswax and foundation comb were not admissible into the Transvaal from overseas, because of colonial legislation before Union, until the Agricultural Pests Act went into force on April 1st, 1912. Regulations under the Act now admit of the entry of these articles into any part of the Union, providing the Department specially authorises the introduction; and this Division is charged with issuing the necessary permits. From April 1st, 1912 to March 31st, 1913, 65 permits were given for an aggregate of 8,357 lbs. of beeswax, and 46 permits for an aggregate of 3,409 lbs. of foundation comb. The Department has ruled that white beeswax (*cera alba*) may be admitted without treatment; but that the admittance of foundation comb must be conditional on its being certified by the suppliers to have been prepared from wax kept heated for $2\frac{1}{2}$ hours to a temperature of 212 deg. F., and the admittance of yellow beeswax conditional on a similar certificate or on such heating on arrival. The plant inspectors at the several ports inspect the consignments and supervise the heating of the beeswax when the step is necessary. The various restrictions are designed to prevent the accidental introduction of bee diseases.

A brood disease of bees in an apiary of six hives at Johannesburg was brought to the notice of the Division in August, 1911. The trouble was not really bad, and was clearly discernible in one hive only, but on suspicion that it might be European Foul Brood the hives, bees and all, were purchased by the Government and destroyed. A nominee of the South African Beekeepers Association was then engaged for a week to inspect all the hives he could find in and around Johannesburg. This inspector had had practical experience with bees in Europe, and he found what he thought was Foul Brood in a few hives at three of the places he visited. Before I had heard of the trouble, a piece of suspected comb had been sent to Pretoria, and had been referred to the plant pathologist, who had reported that he was unable to find any organism which would account for the death of the brood. Another piece had been sent from Johannesburg to the Secretary of the British Beekeepers Association, who had replied:—

“The brood you sent has been microscopically examined by Mr. Cowan, who says:—‘I am afraid it is a case of Foul Brood, although characteristics differ slightly from either of our two forms. That, however, does not matter much, and may have something to do with the climate. Of course, to determine which of the bacilli it is, a cultivation should be made, but I think it is pretty safe to say that it is Foul Brood.’”

A full section of comb, the one most representative of the trouble in the hives bought and destroyed by the Government in August, was sent by the Division to the United States Bureau of Entomology for the favour of examination by Dr. E. F. Phillips, now probably much the best authority in the world on Foul Brood. Dr. Phillips reported:

“The sample of brood arrived in excellent condition, and in view of the importance to the beekeepers of your country has been subjected to an examination much more careful than is usual for routine samples. The irregular appearance of the brood would indicate an abnormal condition but the gross appearance and microscopic and bacteriological examinations of the brood all fail to show any evidence of either of the infectious diseases.”

Meanwhile members of the South African Beekeepers' Association sent samples of brood to Dr. Maason and Prof. Lauder, two eminent European authorities, and under date of January 4th, 1912, the Secretary of the Association wrote to the Division:—

“Since then we have heard from Dr. Maason, who states that not only is any sign of Foul Brood absent, but that in his opinion the disease is not of a contagious nature. To-day we have received the report of Pro-

fessor Zander, who agrees with Drs. Maason and Phillips that Foul Brood does not exist, but thinks that it may be a disease new to science. We have evidence that the disease has existed in South Africa for at least eighteen months, and at present is at Cape Town. So far as we know no bees or used appliances have been removed from the Transvaal to the Cape, so that it would appear, whatever the cause it is fairly widespread. One characteristic of the disease is that it suddenly disappears, without curative measures being adopted, and another that even in the early stages Naphthol-beta as recommended for Foul Brood has no effect."

With the object of keeping in touch with the trouble, whatever it is, the Division engaged Miss M. Dagmar Sillar, late Apiarist at the Government farm, Groot Vlei, near Bloemfontein, to spend a fortnight in May, 1912, inspecting apiaries in and near Johannesburg. Miss Sillar was the first person to express an opinion that the trouble was Foul Brood, and she persisted in this opinion, when after a delay of several months, she reported from England the detail of her inspection. Under date of January 14th of this year she wrote:—

"I am sorry, but I must tell you that I do not think there can be the least doubt but that the disease is Foul Brood in a mild form, for I have had both Messrs. Cowan's and Herrod's opinion, and Dr. Graham Smith's, and other authorities, and they say it is undoubtedly Foul Brood, though it may differ slightly from the disease at Home owing to climatic conditions."

Miss Sillar's detailed report, however, does not suggest Foul Brood to me, or even a trouble of serious importance, and I think it safe to accept the finding of Dr. Phillips and the continental authorities. The South African Beekeepers' Association has been asked to keep the Division posted in regard to the trouble, and also to supply me with a typically diseased comb should a badly affected hive ever come to the notice of any of the members.

Pernicious Scale.—At the beginning of the period reviewed by this report the Division had in hand an erf inspection of Pretoria and its environs, and of Pietermaritzburg and its environs, and a tracing down of all the known sales of deciduous fruit trees from the two nurseries, one in Pretoria and the other in Pietermaritzburg, in which Pernicious Scale had been discovered. The work had for its object the disclosure of the extent to which Pernicious Scale occurred in the country, and the framing of an estimate of the expenditure that would be required for the eradication of this pest. The Division gave attention to little else for several months. In the previous October the Division, under instructions from the Government, had begun to apply stamping out measures, but in a few weeks had been ordered to cease these operations pending the completion of the detailed inspection then proceeded with. I had urged that the eradication measures be continued and pushed ahead with all practicable despatch, and had argued that delay for a complete inspection of places reasonably under any suspicion would be fatal to the chance of eradication that then existed. However, I was directed to continue the inspection and frame the estimate. It was March before the inspection was sufficiently advanced to admit of a report on the desired lines. In my covering minute to the statement then submitted, I wrote:—

"The general terms of my minute of August 21st still hold true, but the difficulties in the way of extermination have immensely increased since its submittal through the natural outward spread of the pest. I am of the opinion that the pest could have been eradicated from the average outbreak then at say one-tenth of the expenditure that would now be necessary. In August there did seem a gleam of hope that the pest could be eradicated from the country without an expense disproportionate to the importance of eradication. Now there is no such hope in my mind, although the initial distribution of the pest has not proved to be greater than what I had in mind and endeavoured to indicate in the August 21st minute. If all thought of attempting eradication is now abandoned, I think the Government might well confine itself (1) to local eradication at centres where the cost would be light and losses through spread likely to be specially heavy; and (2) to careful enforcement of the restrictions on traffic in plants and to nursery safeguards."

The Government thereupon decided not to proceed with stamping out measures either generally or at specific places, and in regard to means for dealing with the pest, I was given instructions "to enforce the restrictions on the traffic in plants, and nursery safeguards,—and to induce owners of infected trees to destroy them or clean them by spraying." In the hope of getting a ruling that would admit of my offering in certain towns to replace infested and suspected plants with young plants of the same kind, providing I was allowed to apply stamping out measures, I later proposed to the Government that it offer compensation to the extent of 1s. to 2s. per tree, according to kind, for the trees that had been destroyed. The Government, however, by its reply showed that it was unwilling to pay any compensation whatever, and I then abandoned hope of securing extermination in any instance where I could not influence the owner to destroy all suspected vegetation in his own interests. It is easy to get the average owner to destroy badly infested trees, and often easy to get him to destroy moderately infested trees, but usually quite out of the question to get him to destroy apparently healthy trees on suspicion; and unless suspected as well as infested trees are taken out root and branch, there is little or nothing to be gained in destroying any over what may be gained by spraying them. Spraying is reliable as a suppressive measure only, not as an eradicated measure even in the case of a limited number of trees.

The report for 1911 was made to include an enumeration of all the outbreaks of the scale discovered up to the time it was written, October 1st, 1912, except one in the town of Estcourt, Natal, which had not been fully confirmed. This one has since proved to be of considerable magnitude. The only outbreaks since brought to light are a few in the vicinity of Pretoria, which are considered to be "jumps" from previously recorded ones. One of these is on an erf adjoining two erven being used for nursery work, and this fact illustrates the menace which the pest will be to nurserymen in any locality in which it intrudes.

The following statement shows where the pest is now known in the country and, in a general way, what the position is (July, 1913), at the several centres. The general inspection referred to was made between August, 1911 and April, 1913. It is probable that most of the places where no live scale is recorded to have been found at the recent visit are still infested to a slight extent.

TRANSVAAL.

Pretoria and nearby townships:

Town Centre: Main outbreak in the town due to local sales and to spread from nursery where the pest for first time recognised, July, 1911, on growing trees in South Africa. Pest supposed to have been introduced in 1905 or 1906. At general inspection about 1,400 plants and 18 hedges on about 70 properties scattered over about 85 acres more or less infested. Nursery practically abolished and infested trees on about 28 properties destroyed, 1911. Spraying on about 31 properties carried out in 1912. In 1913, scale found to have spread on to most remaining properties within its 1911 limits, 83 additional properties being found to be infested, and limits of infested area seen to have considerably increased. Conditions on whole in 1913 very much worse than a year before, but some properties, once badly infested, now practically clean owing to spraying. Detailed report on this and other parts of town made (July, 1913) to Town Clerk and consideration of municipal action urged.

Railway Reserve: At general inspection 25 infested trees found on 3 properties. Introduction, 1908 (?). Infested and suspected trees destroyed by Railway Department and surroundings sprayed, 1912. No live scale found, 1913.

Pretoria West: At general inspection 3 centres involving 145 infested trees on 12 properties found. Introduced 1908-1911. Known infested trees destroyed on 5 of the properties, and 8 sprayed, 1912. No live scale found on 5, and much on one only, 1913. Very little spread.

Arcadia (including Eastcliff, Brynterion, etc.): At general inspection 11 centres involving 370 infested trees on 23 properties found. Introductions, 1908 and later. Known infested trees destroyed on 15 properties; and satisfactory action taken on all properties except one minor one, 1912. Known infested trees on the exception since destroyed and surroundings sprayed. No live scale found on 14 of the properties, and 7 of them believed absolutely free of the pest, and scale nowhere found bad or being neglected, 1913.

- Sunnyside: At general inspection 5 centres involving 20 infested trees on 5 properties found. Introductions 1909 and later. Known infested trees destroyed on 4 of the properties, and effective action taken on all, 1912. No live scale found, 1913.
- Hatfield: At general inspection 7 centres involving 52 infested trees on 10 properties found. Introductions 1908 and later. Infested trees destroyed on 5 of the properties, and two places sprayed, 1912. No live scale found on 6 of the properties, and not very much on any, 1913. Spread slight.
- Hillcrest: At general inspection one centre involving 15 infested trees on 2 properties found. Introduction 1908 or 1909. Both places sprayed, 1912. No live scale observed at one and only one moderate infestation at other, 1913. No spread noticed.
- Brooklyn: At general inspection 9 centres involving 52 infested trees on 11 properties found. Introduction 1908 and later. Known infested trees on 8 of the properties destroyed and 5 places sprayed, 1912. Live scale detected on only two of the places, 1913. No spread noticed.
- Muckleneuk: At general inspection 3 centres involving 14 infested trees on 3 properties found. Introduction 1909 and later. Infested trees on principal place destroyed, 1912. Live scale found on all three places, 1913, but not abundant. No spread noticed.
- Riviera: At general inspection 2 centres involving 9 infested trees on 2 properties found. Introduction 1907 and later. Known infested trees destroyed or well sprayed 1912, and no live scale found there, 1913. Additional centre of one property with 5 infested trees discovered 1913. Sprayed at once.
- Claremont: At general inspection 16 trees on one property found infested. Introduction 1908. Sprayed, 1912, and no live scale detected, 1913.
- Daspoort: At general inspection 139 trees found infested on 5 properties, all separate centres. Introduction 1907 and later. Known infested trees destroyed on all places. Two sprayed, 1912. A little live scale found two places only, 1913. Spread to one additional property detected.
- Daspoort Estate: At general inspection 42 trees found infected in one centre on three properties. Known infested trees destroyed and two places sprayed, 1912. Much live scale found on about 10 trees at one place, and a little on a number of trees at both other places, 1913.
- Pretoria Gardens: At general inspection 25 infested trees found at two centres involving 5 properties. Known infested trees destroyed at two principal places, and 3 places sprayed, 1912. A little live scale found on all 5, 1913.
- Mountain View: At general inspection 51 infested trees found in one centre involving 7 properties. Introduction 1908 (?). Infested trees destroyed at two of places, and one place sprayed, 1912. Live scale found at 6, and very abundantly on two places, 1913.
- Parktown: At general inspection 83 infested trees found at 4 centres on 5 properties. Known infested trees destroyed, one place and two places sprayed, 1912. Live scale found very abundant on one property, and at least present on three others, 1913.
- Roseville: At general inspection 3 infested trees on one property found. Condition apparently no worse in 1913.
- Mayville: At general inspection 154 infested trees in one centre on two properties found. Introduction 1908. Known infested trees destroyed 1911. Both places sprayed, 1912. Little scale detected at one of places 1913.
- Les Marais: At general inspection 58 trees and 4 quince hedges found infested in one centre on 7 properties. Introduction 1908. Principal place denuded of known infested vegetation (52 trees and one hedge), and the few known infested trees (4) on two other properties, also destroyed, 1911. Two minor properties sprayed, 1912. Scale found on 5 of the properties, very abundant on 3, in 1913. Probably also spread to other properties.
- Wonderboom South: At general inspection 66 trees and a quince hedge found infested on one property, and one tree on another. Introduction 1908. All trees at latter place removed. Former place sprayed, 1912. Only a little scale detected, 1913.

- Gezina: At general inspection 223 trees (nearly all small), and 4 quince hedges found infested on 17 properties in 7 centres. Introduction, 1907-1911. Ten places sprayed, but 7 neglected, 1912. Live scale found at 13 of places, 1913, but nowhere very abundantly, which probably indirectly due to drought. Pest slowly spreading and rapid spread probable in good seasons.
- Rietfontein: At general inspection 191 trees (nearly all small), and 6 quince hedges found infested on 23 properties in 7 centres. Introduction 1908 and later. Trees destroyed at one place, 9 sprayed, and 13 neglected, 1912. Live scale found at 19 of the places, 1913, and rather bad at 3 of these. Pest not at present flourishing, and spreading only slowly, which attributed to dry season and absence irrigation.
- East Lynne: At general inspection 76 trees on one property, and one tree on adjoining property found lightly infested. Introduction (?) Minor place sprayed, but major one neglected, 1912, beyond destruction few worst trees, yet no increase of scale, perhaps owing to defoliation trees by drought. Scale at both places about the same as was first found.
- Pretoria North: At general inspection one tree found infested. New tenants, but probably spraying done in 1912, as only a little scale found, 1913.
- Rayton (Pretoria District). In original inspection two attacked trees found in large two year old orchard. Known infested trees and those surrounding them destroyed at once. Orchard sprayed, 1912. No scale detected, 1913, and property considered free.
- Scheerpoort (Pretoria District). In original inspection one outbreak found in two adjoining farm gardens. 55 trees and quince hedge infested. Introduction, 1909. Infested trees (5) in one garden destroyed, 1912. Place not visited in 1913, but scale said to have spread much. Spraying promised.
- Cullinan (Pretoria District). In original inspection 5 outbreaks found on 10 properties. In all 75 infested trees found. All fruit trees on 2 properties destroyed, and remaining places, with one exception sprayed, 1912. Much live scale found on the unsprayed place, and little on six others in 1913. Premier Mine Company attending to situation.
- Bronkhorstspuit and vicinity (Pretoria District). Three outbreaks found at original inspection. Two in township on 4 properties. 122 infested trees found, of which 27, all first found infested on one place, destroyed in July, 1911. Introduction in 1908 and 1909. Two places sprayed, 1912, but all four badly infested in 1913. Many trees dying. One outbreak on farm Vlakkfontein. 50 trees found infested in 1911. Introduction in 1908. No action 1912. Property untenanted and neglected, but most scale dead owing to grass fire, 1913.
- Witbank and vicinity (Middelburg District). Six outbreaks discovered at original inspection. Four involved two township and three mine properties, 124 infested trees being found. Introduced 1908 and 1909. All five properties sprayed in 1912, but apparently not properly. Live scale found all five, 1913,—abundantly at three, and slight at others. Infested area increasing. Municipal action urged and authorities state helping to best their ability. Fifth outbreak in farm garden near Oogies, 7 trees infested. Introduction 1908. Known infested trees and other trees in same block destroyed, 1912. Scale found bad in a neighbouring block, 1913, but trees there being taken out. Sixth outbreak in farm orchard of 900 trees near Balmoral. 119 infested trees originally found. Introduction 1908. Trees cut back and sprayed twice, 1912. Only a little live scale found, 1913, and all trees being again sprayed.
- Middelburg and vicinity. Two outbreaks at original inspection. One in township on two properties where 19 infested trees detected. Introduced 1909. Both places sprayed 1912. Little scale only found at both, 1913. Spraying will be kept up. Municipal Council notified relative position. Second in farm garden near Wonderfontein. About 20 trees infested. Introduction 1910. Sprayed 1912. Only a little live scale, 1913. Will continue spraying.
- Nylstroom: Five outbreaks involving 6 town properties found at original inspection. 75 infested trees detected. Introduction, 1908-1910. All places sprayed, 1912. Not visited in 1913. Municipal action recommended.

Standerton and Meyerville. At original inspection infested trees detected on 78 properties, all parts of town being involved. Inspection not completed, but several thousand trees thought infested. An introduction of many infested trees occurred 1907, but an earlier introduction suspected. Town Council sprayed 25 properties at cost, 1912, and few others privately sprayed but most neglected. In 1913 condition on whole vastly worse than 1912. Town Council again spraying and endeavouring to get bye-law to make repressive action compulsory. Pest now established in majority of gardens in the town and in four gardens adjoining town of Meyerville.

Benoni: At original inspection majority of about 400 trees in farm orchard (about 5 miles from town), infested. Introduction, 1907. No action 1912, and conditions extremely bad 1913, many trees having died from the scale. Neglect likely to continue unless owner adopts Division's recommendation to lease orchard on condition it be well sprayed. Nearest neighbour notified of circumstances, and urged to do utmost to get satisfactory action taken.

Boksburg: Five outbreaks on as many town properties found at original inspection, scale being detected on 55 trees. Introduction, 1909-1911. Infested trees at two minor places destroyed, and surroundings sprayed, 1912, and no live scale found here, 1913. Trees dying of neglect at third place, and scale seems to have perished there, 1913. Fourth place sprayed three times in 1912, and no live scale detected, 1913. Fifth place neglected, and live scale found extremely bad there, 1913. Municipal action urged.

Bethal and vicinity: Three outbreaks discovered at general inspection. One in town involving 6 properties, on which 248 infested trees found. Introduction, 1908. Five of the 6 places sprayed, but only one properly 1912; nothing done at 6th place. Live scale found at all places in 1913, and very plentiful at all but one. Condition very unsatisfactory. Municipal action urged. Second outbreak in garden of about 70 trees on farm Gelukspruit. 17 trees found infested. Introduction, 1908. Action not ascertained. Third outbreak in orchard of about 250 trees on farm Ijzervarkfontein. 24 trees found infested. Introduction 1908. Some trees destroyed, and remainder sprayed three times, 1912. Considerable live scale, 1913, and better spraying promised. Later outbreak reported July, 1912, in garden about 400 trees on farm Kafferstad. Introduction, 1907 or 1908. Infested trees cut back and sprayed, 1912. Over 100 trees and long privet hedge found infested, many badly, 1913. More extensive spraying promised.

Amersfoort: One outbreak on four township properties. 110 trees found infested at general inspection. Introduction, 1907. Known infested trees on three properties sprayed 1912. Scale taken on infested trees to another part of town, 1912. Much spread during year, and live scale abundant on three properties, 1913. Municipal action urged.

Heidelberg: One outbreak, apparently confined to two trees, introduced in 1909, discovered at general inspection in large orchard on farm Schoongezicht. Known infested trees destroyed, and surrounding ones sprayed, 1912. No scale detected, 1913. Spraying continued.

Boskop (Potchefstroom District): One outbreak, apparently confined to two trees introduced in 1911, discovered at general inspection in small farm orchard. Known infested trees destroyed, and surrounding ones sprayed, 1912. No scale detected, 1913.

Johannesburg: Three outbreaks discovered at general inspection. One in Yeoville, apparently confined to two plants, introduced, 1909. Known infested plants destroyed, and garden sprayed, 1912. No scale found, 1913. Second outbreak on 3 properties in Parktown, on which 26 infested trees detected. Introduction, 1907. All places sprayed, 1912, but a little live scale found on two of them, and also in two neighbouring gardens, 1913. Third outbreak on 2 properties in Newclare, on one of which 22 infested trees found, and on other 2. Introduced in 1907. Known infested trees at minor place destroyed, and both places sprayed twice, 1912. No live scale found, 1913. Municipality has now undertaken to spray the places involved in all three outbreaks.

ORANGE FREE STATE.

Viljoen's Drift: On outbreak on 3 properties, 84 trees being found infested, discovered at original inspection. Introduction, 1907. Outbreak burned out in 1912 by Division in co-operation with Vereeniging Estates Co. and Railway Department. No scale found, 1913.

Kroonstad: Two outbreaks found at original inspection. One in convent garden near town, 162 trees found infested in garden of 277. Introduction, 1908 (?). About 80 infested trees destroyed, and garden wall sprayed, 1912. Scale checked and spraying continued, 1913. Municipal Council informed. One outbreak in small garden on farm Dansfontein. 7 trees found infested. Introduction, 1907. Place neglected and scale not flourishing. Inefficient spraying, 1912. Conditions no worse, 1913.

NATAL.

Richmond: An outbreak in village discovered in 1911. Introduced in 1906, but evidently scale did not flourish. Infested and suspected trees burned in 1911, and no scale found late in 1912, when last inspected.

Moorleigh: One outbreak in small garden on two farm properties. 32 infested trees found at general inspection. Introduction, 1906, but scale did not flourish until trees transplanted some years later. Known infested trees destroyed, and remaining trees sprayed, 1912. Not visited 1913.

Hilton Road: One outbreak in country garden, apparently confined to two trees transplanted from Frere about year before, discovered at general inspection. Known infested trees burned, early in 1912. No scale detected, 1913.

Pietermaritzburg: Two outbreaks. One in large nursery, apparently confined, when detected, to two spots a few feet square in apple stock bed, and to 11 recently grafted apples. Introduction of scale conjectured to have been from oversea in 1905. Outbreak burned out December, 1911. No scale detected at any of several close inspections since made. Second outbreak in two town gardens found at general inspection, when scale detected on 41 trees. Introduction, 1908. All infested and suspected plants on principal property, and part of that on other burned early in 1912, and remaining suspected vegetation sprayed. A very little scale found on the minor property and on two nearby properties, 1913. Municipal action now urged, but Local Nurserymen's Association may privately arrange for destruction all trees in infested gardens.

Utrecht: One outbreak in town garden, 11 trees being found infested, discovered in general inspection. Introduction, 1907. Outbreak not visited, 1913, but Municipal authorities urged to ensure that proper spraying done.

Newcastle: A single year old tree in town garden found slightly infested at general inspection. Tree burned and surrounding ones sprayed. Not visited 1913. Occupier urged to watch and report if any scale appears, and town authorities informed.

Dundee: A single recently planted tree in town garden found infested with a single scale, possibly Pernicious Scale, at general inspection. Tree destroyed. No spread suspected, and outbreak not since visited, but occupier urged to watch and report if any scale appears, and Municipal Council informed.

Frere: Extensive outbreak on 8 properties in vicinity country railway station, discovered at general inspection. About 800 trees more or less infested, most very lightly, but some very badly. Origin doubtful. One place sprayed, probably ineffectively, 1912. Further inspection has disclosed pest on 13 properties in all, and on one nearly 2 miles from station. About 1,500 trees estimated to be infested. Satisfactory voluntary action improbable, but centre surrounded by open country. Railway Department has promised destruction susceptible fruit trees on its property. Stationmaster cautioned against accepting plants for conveyance. Local hotel requested to post notice describing pest, and urging action.

Vryheid: Two outbreaks in town discovered at general inspection. One in small garden where 4 infested trees found. Introduction, 1909. 8 trees burned and some others sprayed, 1912. Little live scale found on two trees, 1913. Second outbreak on 3 properties, and about 150 trees found infested. Introduction probably 1907. About 70 of known infested trees destroyed, and most remainder sprayed, 1912. Considerable live scale found, 1913, and Municipal action recommended.

Estcourt: Not visited in general inspection, but scale discovered in looking up suspected trees in October, 1912. Infestation widespread, and perhaps a thousand or more trees, and majority of gardens in the village involved. Village small and surrounded by wide stretch open country. Chairman of Local Government Board, Magistrate, and Postmaster, requested to post notice urging spraying, 1913.

The precautionary measures which have been taken to check the dissemination of the pest with plants are dealt with in the sections of this report dealing with nursery inspection and plant removal regulations. To check the local spread, the occupiers of all the properties known to be infested were urged to spray. A leaflet containing explicit recommendations was printed, and a copy accompanied by an explanatory letter sent to or delivered to each party. As a further step to secure action, communications explaining the situation and urging that an earnest effort be made to get all infested and suspected trees sprayed were written to the local governing bodies at Nylstroom, Middelburg, Cullinan (Premier Mine), Boksburg, Bethal, Standerton and Amersfoort.

The response to the appeal to spray was, on the whole, gratifying; but, as had to be expected, many occupiers of infected property took no action at all, and many others sprayed to little effect, probably owing to slovenly application. Lime-sulphur wash and "Scalecide" were the spray fluids chiefly employed, and both proved highly efficient, the results in the case of many individual trees appearing to be perfect six months or more later. The Scalecide seems to have given good results more consistently, doubtless because it is a simpler matter for an inexperienced party to apply it so thoroughly that every portion of the tree is coated. A large number of parties cut down the trees which were known to be infested, and sprayed the surrounding ones. An effort is being made to have an experienced inspector visit all the properties which were known to be infested, in order to advise the occupiers on the present condition of their trees, and to encourage them to spray in the coming winter. Most properties have already been visited.

The stamping out measures applied at Richmond, Natal, and Viljoen's Drift, Orange Free State, appear to have been entirely successful; and no scale was found in recent inspections of several places where only a few very young plants were discovered to be infested, and were at once destroyed.

Neglect of the scale has been the rule rather than the exception in the case of rented town properties, especially in the poorer parts of Pretoria and at Standerton. The occupiers, as a class, are indisposed to spend anything at all for the preservation of the trees in their gardens, and the trees, as a rule, represent no money outlay to them, they for the most part being seedling peaches or trees put in by former occupants. A surprising number of the properties in Pretoria are now occupied by tenants different to those of a year ago, and most of the new tenants, when recently called upon, were found to be without knowledge of or interest in the pest. The municipal authorities of Standerton accepted an offer to discuss the situation in their town with me, and as the outcome of the discussion they purchased a spraying outfit and undertook to spray infested gardens with Scalecide at the estimated cost. But the majority of the occupants failed to take advantage of this good chance to have their places treated; and despite the considerable amount of spraying that was carried out, the pest is far worse now than a year ago. It has spread to many more properties; and the Division inspector, after a recent survey of the conditions, reported that, roughly speaking, the pest is now twenty times as abundant. The Town Clerk reported that 1,591 trees in twenty-five gardens were sprayed with the municipal outfit, and that the expense for material and labour averaged 3½d. per tree. Most of the Standerton trees are very small.

The climate on the high and middle veld districts evidently suits the scale very well indeed, and it is to be feared that the climate in all parts of the Union where deciduous fruit trees thrive would also prove quite favourable to its welfare. The measures which the Division is taking in regard to nurseries and plant traffic may reasonably be expected to restrain the spread of the pest over the country to a very marked degree; but there is no hope that they will prevent its slow extension

into all the gardens in the towns where it has become established, and its eventual spread to other towns and on to farms. It will spread fast or slowly dependent on the steps taken locally to hold it back. The experience of the past year has amply demonstrated that spraying as a suppressive measure is cheap and highly satisfactory, and has also demonstrated that good spraying has a very decided value in retarding local spread. One thorough spraying every winter is evidently all that is required to prevent damage to a tree; but two or three thorough sprayings in one winter may be necessary to get the pest well under control in the case of trees which have been allowed to become badly infested by neglect in one or more years.

The Division is not in a position to give any further assistance in securing the adoption of spraying for the suppression of the scale. During the present winter, as was done last year, all parties who are known to have it on their premises will be urged to spray, and it will be proposed to municipal authorities that they consider the advisability of their enacting a bye law to require suppressive measures; but it is probable that systematic efforts in these directions will then have to be dropped. The pest is constantly spreading, and a re-inspection now would probably disclose its presence on fully double as many urban and suburban premises as were found to be infested in the inspection made eighteen to twenty months ago. The pest not only spreads in an ever widening circle from an infested centre, but in towns forms new centres by long "jumps" from badly infested ones, and it follows that without periodical re-inspections it would be impracticable to keep in close touch with the position. Re-inspection by the central government are out of the question on account of the expense, but local governing bodies might be able to arrange for them cheaply in connection with other work. The "jumps" referred to are presumed to be due to infestation brought by alighting birds. The scale, in such cases, chiefly infests one or more branches high in the tree whereas, if it was introduced with the tree from a nursery it is much more general in its distribution.

Locusts.—Migratory locusts gave no material trouble in any part of South Africa during the period covered by this report.

The Red-winged Locust was not reported from any place in the Union. In January, 1912, the Lourenco Marques Department of Agriculture reported that a few eggs of the species had been laid in Inhambane District, and that a few hoppers had been located and destroyed in the same district, and in the Lourenco Marques District. In June, a report from Beira recorded a swarm of fliers proceeding south-west over the Sabie River. Several reports of "Red Locusts," received in September and October from western districts of the Cape Province, were found to refer to a species of *Phymateus*, a large clumsy bodied, gaudily coloured grasshopper. A report about the same time from the Uitenhage District of a small swarm destroyed at once by the police probably referred to an allied species.

A small swarm of Brown Locust voetgangers was reported in January from a farm in Hay District of the Cape Province. It was stated to have been destroyed by birds.

Since the period for which this report is being written has elapsed, a considerable part of the Middelburg District (Cape) lying to the south and east of Rosmead Junction has been visited by the Brown Locust, and eggs have been deposited on a number of farms. The parent swarms probably developed unnoticed in the area, and they died off without causing appreciable loss. Action against the pest will be taken when the eggs hatch.

Correspondence and Publications.—Throughout 1912 the Natal correspondence was attended to from Pietermaritzburg by the Natal Entomologist, now transferred with his staff to Pretoria; and throughout the full period to March 31st, for which this report is written, the Cape Entomologist has attended to the Cape correspondence from Cape Town. The bulk of the correspondence of the Division, however, has been from the headquarters in Pretoria, and the numbered correspondence from here amounted to 5,878 letters and 852 telegrams. The telegrams were chiefly to the plant inspectors in connection with potato and other imports. Apart from the numbered correspondence, some hundreds of letters on headed office paper, but printed by a manifolding machine except for a few lines, were sent to parties who had Pernicious Scale on their premises; and some thousands of typed circulars and circular letters were despatched to nurserymen, potato importers and others.

The chief contribution of Division officers to the *Union Agricultural Journal* were as follows:—

Title.	Writer.	Issue.	Pages.	Illustrations.
Pernicious Scale Notes : Outbreaks	C. B. Lounsbury	Vol. III. February	279-281	
Fig Weevils	Claude Fuller	April	533-534	
Pernicious Scale Notes : Further Outbreaks	C. P. Lounsbury	May	717-719	
White Grubs in Sugar Cane Fields	Claude Fuller	June	796-799	
Pernicious Scale Notes : Government Policy	C. P. Lounsbury	June	852	
Pernicious Scale Notes : Spraying Recommendations	C. P. Lounsbury	Vol. IV. July	126-131	
The Codling Moth	C. P. v. d. Merwe	August	292-301	10 figures.
The Willow Tree Caterpillar ...	C. B. Hardenberg	September	397-418	21 figures.
White Ants in Natal : Their Nature and Treatment	Claude Fuller	September	346-369	12 plates and 3 text figures.
do.	do.	October	543-471	do.
The Elegant Grasshopper	C. P. Lounsbury	November	753-755	
The Phoenix Skipper	Albert Kelly	December	876-883	5 plates and 1 text figure.
Insect Notes : Pernicious Scale ; Elegant Grasshopper : <i>Bagrada</i> Bug : <i>Cineraria</i> Snout Beetle ; Codling Moth : Fruit Fly ...	C. P. Lounsbury	December	919-922	
The Sombre Twig-pruner	Claude Fuller	Vol. V. February	263-288	10 plates and 3 text figures.
Caterpillar Wilt Disease	C. P. Lounsbury	March	448-452	

Division Exhibit at Agricultural Show.—Six months of Entomologist Hardenberg's time in 1912, and six months of Plant Inspector Thomsen's time in 1912-1913 were almost entirely taken up in the renovation of, and preparation of new features for, the Division's portion of the Department's Agricultural Show exhibit, and to its display at the chief shows of the four provinces. Owing to its understaffed state, this work is a severe strain on the resources of the Division. It is felt to be an advantage to have a senior technical officer accompany the exhibit in order that any information about insects which is given to enquirers may be reliable; but if it proves to be practicable a clerical member of the staff will be given charge of the exhibit on its rounds next year in order that the time of technical members may be spared for needful investigations. Heretofore no clerical member of the staff has been available for the task. As I indicated in my last annual report, the expense of maintaining and displaying a creditable exhibit is very heavy. It might prove practicable to effect a substantial saving for the Department as a whole by having one officer take charge of the exhibits of several divisions. Now each division sends an officer for its exhibit. The officer costs not only his salary but travelling and subsistence expenses.

Technical Work.—Owing to the press of work in connection with Pernicious Scale, nursery inspection, plant and potato import and plant traffic regulations, the progress made by the Division in insect investigations, and generally in the acquirement of new information on insect problems, has unavoidably been small. To altogether too great an extent the Division has to base on knowledge gained in other countries the advice it gives to South African farmers; and I shall not be satisfied with the organisation and work of the Division until the thorough investigation of entomological problems becomes the leading feature in its plans.

His general duties as Entomologist for his province and special duties in connection with Pernicious Scale absorbed most of the attention of Mr. Fuller as Natal Entomologist before the virtual abolition of his old post and his transfer to Pretoria to occupy what may be considered a higher post. In the technical output of the period for himself and his assistant, Mr. Albert Kelly, may be mentioned the investigations reported in the articles on white ants, the privet pruner, and the phoenix butterfly enumerated in the list of articles contributed to the *Agricultural Journal*. Much attention was also given to wattle insects, in particular to the wattle bagworm, and a lengthy report on this subject will soon be published,

The Cape Entomologist, Mr. C. W. Mally, is protected as much as practicable from routine work, compatible with his giving general attention to non-administrative entomological matters in the Cape Province, in order that he may make investigations his major concern. It was not designed by me that he should have to trouble himself with regulations and their enforcement except in a most general way; but my plan in this direction has been upset by an instruction that I have him supervise the entire work of the plant inspector at Cape Town in order that the public may be able to refer to a senior officer locally when they wish a ruling or information unobtainable from the plant inspector. During the period reviewed, he has further been unable to give very special attention to any one subject owing to vacancies in his staff, and to his absence on sick leave for several months. The nature and extent of his work may be inferred from the statement, submitted by him, which I attach as a supplement to this report.

Entomologist Hardenberg has been kept almost exclusively on investigations other than during the period, alluded to above, when he had charge of the Division exhibit for agricultural shows. His first special work after the shows were over was the preparation and illustration of the article, published in the *Agricultural Journal*, on the willow tree caterpillar. This article summarized studies which he had had in progress from the previous year. He was then assigned to studies on peach tree aphides; and the results of his several months' observations on these pests, and of a demonstration of the efficacy of spraying for their control, is soon to be published. Towards the close of 1912 the Division was directed to make an exhaustive investigation of the insect pests of the wattle, and Mr. Hardenberg was then put in charge of this new phase of the Division's activities. Owing to the importance and its marking a new departure, this subject will be accorded a paragraph under a special heading.

Among the minor subjects which have engaged the attention of the Pretoria headquarters were tests in the utilization of the caterpillar wilt disease and of the coccobacillus disease of grasshoppers, and a successful demonstration of the value of the Mally fruit fly remedy under highly adverse conditions. These several matters have been dealt with in portions of the monthly reports of the Division which have been sent to the *Agricultural Journal* for publication.

Investigation of Injurious Insects of the Wattle.—The satisfactory solution of many important South African entomological problems will not be attained until they have each been exhaustively investigated by one or more competent entomologists working almost exclusively on them for a series of years; and it is an ambition of this Division to take up one after another of these subjects for solution as the strength and efficiency of the staff admits of proper attention being given it. The wheat aphid, the maize stalk borer, mestworms (cutworms), potato tuber moth, and root gall worm are examples of these subjects. Another example is the native thorn tree (acacia) bagworm insect in its relation to the wattle bark industry. This insect has seriously damaged wattle plantations over large areas in recent years, and pressure has been brought to bear on the Government to secure complete study of the problem with the view of eliciting some satisfactory means by which the losses may be mitigated. Mr. Claude Fuller, while Natal Entomologist, gave the problem much thought and close study as will be clearly manifest from a long report by him, which at present awaits publication; but Mr. Fuller was not able, owing to his numerous other duties, to make his studies exhaustive and, in this case, it is only through exhaustive attention that an entomologist can hope to settle the momentous question of what, if anything, can be done to improve the situation. Mr. Hardenberg has been detailed for the task, and he will soon have a trained assistant to help him. It is intended that these officers apply themselves exclusively to the bagworm and other insects which affect the wattle tree injuriously. A special field station for the investigations has been equipped at New Hanover, Natal, and it is planned that the work be prosecuted for at least two years. Other subjects, perhaps, had as good a claim for special attention as the bagworm; but there was someone to press the claim of this one, and it is certain that the progress of the investigation will be watched with great interest by prominent wattle growers, and immediate advantage be taken of any promising treatment which may be proposed. Moreover, facilities for conducting observations and making experiments will be afforded by those who stand to benefit by the investigation; and altogether the choice of the bagworm as the first insect selected for practically undivided attention for a long period at a special station appears to be a wise one.

CHAS. P. LOUNSBURY,

Chief, Division of Entomology.

SUPPLEMENTARY REPORT OF CAPE PROVINCE ENTOMOLOGIST.

I was on sick leave until the early part of June owing to a severe attack of enteric fever contracted while engaged on Pernicious Scale duties at Pretoria in December, 1911. After then, in addition to the usual office routine, I have given more or less special attention to the following:—

Olive Fly Parasites.—During May and June five lots of olives, presumably infected by maggots of the olive fly, *Dacus oleae*, were sent to Dr. F. Silvestri at Portici, Italy, for the purpose of establishing the South African parasites of this fly in Italy. The bulk of the work in this connection was done under my direction by Mr. P. B. Cloete of this office; Mr. W. W. Brighton-Manning, at the time Assistant at Rosebank; and Mr. S. M. Wood, Plant Inspector at Cape Town. The olives proved to be only slightly infested, and in conversation with Dr. Silvestri during his visit here in March I gathered that the results were negative. It is planned to continue the work in the coming season.

Black Scale Parasites.—During April, May, June and July nine lots of Black Scale (*Lecanium oleae*) were sent to California for the purpose of establishing South African parasites of this scale insect in America. The work was carried out under my general supervision by Mr. P. B. Cloete, Mr. S. M. Wood, Plant Inspector, and Mr. W. W. Brighton-Manning. Very encouraging letters were received from California in regard to these sendings, but information as to the practical results of the work has not been received as yet.

The Australian Bug (Icerya purchasi), caused considerable trouble at the Cape Orchard Company's, Orchard Siding, being especially bad on Winter Nelis pear trees. Although several colonies of *Vedalia cardinalis* were distributed there, for some reason the ladybird did not become established as quickly as usual, although a few specimens were found during July. As there was no guarantee that the ladybird would be effective, Mr. Dicey sprayed the infested trees during the first week in July with Scalecide varying in strength from 1-10 to 1-16. The trees were examined by me on July 19th, and the strongest spray made the best showing, but even that did not completely penetrate the egg masses. Many young were hatching, and numerous older insects (from quarter to full grown) were apparently uninjured. Careful counts were made at all stages. In some case only 10 per cent of the insects were sound, but in others as high as 50 per cent. survived.

The force of the spray no doubt had a great deal to do with the percentage of insects destroyed. On such large trees the force with which the spray strikes the insects will vary from branch to branch. Where the insects evidently got the full force (*i.e.*, close to the nozzle), the penetration was complete; but further away it was more superficial, only penetrating the waxy covering. This suggested the idea of *progressive penetration*, *i.e.*, getting the waxy covering saturated by one spraying, and thus leaving the way open for the oil from a second application to penetrate completely. But this also meant that the buds might be penetrated in the same way, and that the trees might be severely injured. Mr. Dicey, the Director of the Company, faced the possibilities with characteristic courage, and decided to go ahead. The trees were accordingly resprayed on August 22nd, using Scalecide 1-10 under heavy pressure (about 200 lbs. per square inch). Under date of 6th November Mr. Dicey wrote as follows:—

“You will be glad to hear that the bug in the Winter Nelis has been, so far as I can see, wiped out, but the trees have been badly hit with the Scalecide spray, and a lot of the wood is dead. It may be, of course, that the buds and the trees have been injured by the bug itself, and that may account for the trees not coming out.”

From my examination of the trees at the time, and also later on, I am satisfied that the injury to the buds and the twigs was due to *progressive penetration* on the part of the Scalecide.

It was difficult to find a live Australian bug in December, and the trees were recovering.

Buchu Beetle.—The Buchu Beetle, *Oblabera hottentota*, was the subject of serious complaint during August owing to its depredations on young buchu seedlings at Mr. F. J. Versfeld's farm “Mantons Valley,” Piquetberg. An investiga-

tion on the spot soon showed that it was useless to spend time and money on spraying, because the beetles were continually coming in from the veld, and the seedlings were so small that the beetles would have to devour them entirely to get a destructive dose of poison. The presence of numerous fully developed larvae in the soil showed that the pest would continue for some time. The only way to save the situation was to protect the plants by mechanical means. I therefore devised a small cap of wire gauze to put over each plant (over 2,000 in all). Mr. Versfeld took the work in hand very energetically, and soon had the plants protected, and the labour that before was required to go over the plantation every hour of the day was available for other work.

This beetle was recorded from fruit trees some years ago; but the damage was so slight compared to the size of the tree that it was not considered worth troubling about.

Strawberry Ground Beetle.—At Stellenbosch a species of Carabid did serious damage by eating into the half grown to fully ripe berries. There were hundreds of larvae and pupae in the soil, and the only suggestion that seemed at all likely to give relief was to try and poison the beetles by means of a bait sown broadcast. The season was too far advanced to get a decisive demonstration of its efficacy; but the work will be continued this season if the conditions demand it.

Strawberry Weevil.—A snout beetle, not represented in our collection nor in the collection at the South African Museum, did considerable damage to strawberry plants about the time the fruit was ripening. The larvae fed from the underside of the leaf and the holes in the strawberry leaves are the first signs of the presence of the pest. A spray of 1 lb. arsenate of lead in 25 gallons of water was recommended, and so far as I know gave good results. The same beetle was found at Rosebank, and it was kept under observation for some time. The larvae transform in cells, which they form just below the surface of the ground. To my surprise Mr. Manning found scores of the adults and pupae in the matted grass and weed roots in one of the old lucerne drums behind the Station. What they fed on in the drum I do not know; but it is clear proof that they have some other food plant besides strawberries.

The Maize Stalk Borer (*Sesamia fusca* Hamp.) was the subject of an enquiry from Mr. W. Gilchrist, Mariendahl, Mulders Vlei, during August. I went over the place with him with a view to making practical suggestions to prevent injury for the coming season. Mr. Gilchrist carefully destroyed all the old mealie stumps and stalks on the place, and as a result I could hardly find a specimen in the new crop up to the time it was cut for ensilage during March. From the examination of the old stalks and stumps I came to the conclusion that his greatest loss was due to Black Beetle, Cutworms, and Yellow Stalk Borer, *Sesamia ruteria*. As the season advanced it was apparent that this conclusion was correct, the Black Beetle, as described later below, being the chief depredator.

The Black Beetle (*Heteronychus arator*) proved to be a serious pest in the maize lands of Mr. Gilchrist, Mariendahl, Mulders Vlei. It was also destructive to the bowling green at Rondebosch, and it was here that I found the beetles and larvae crawling about on the surface of the ground, mainly at night. At night the "green" was the parade ground for the toads in the immediate vicinity, and they eagerly snapped up the beetles and the larvae that came to the surface. As daylight approached the toads retired, and the birds in the surrounding trees took their place, and eagerly snapped up any beetles or larvae in sight!

Beetles and larvae were found in the ground at Mariendahl during February and March, and arrangements were made to try poisoning the beetles during April and May by means of a bait.

The House Fly (*Musca domestica*) has been given considerable attention since October, with a view to working out a practical scheme for its control. The most striking result was the discovery of a parasite which emerges from the pupae, and in some cases as high as 15 per cent. of the pupae were parasitized. Dr. Silvestri took living material along with him to Australia and Honolulu in the hope of establishing them there.

The Lucerne Tylenchus has been kept under observation during the season. Despite the fact that the pest has been at work in the lucerne at the Station for

three or four years the lucerne holds its own, and it has only been during the spring months that it seemed to make headway. While it has been in evidence the whole season, it seems to go off as hot weather approaches, and one really has to hunt to find good specimens. This seems to be true in the majority of cases observed, and it makes one feel more hopeful of the situation as a whole.

The Fruit Fly (*Ceratitis capitata* Wied.) was not much in evidence in this Province up to the first of March, but after that it seemed to be on the increase, especially in pears. No effort was spared in assisting Mr. Silvestri to get material for the parasites he collected on the West Coast, and before he left for Hawaii he had a goodly number of puparia of the abovenamed species as well as *C. rubivora*, and it is hoped that parasites will emerge and become established in Australia and Hawaii.

The Grain Bug (*Blissus diplopterus* Dist.) was very abundant in wheat lands in the Piquetberg district the last week in August, and it was feared that very serious damage would be done to the crop. The farmers were familiar with it under the name of "Stink⁴Vlieg," and said it disappeared under the influence of the heavy rains. Heavy rains did come later on—in fact it turned out to be an exceptionally good season, and there was no complaint in regard to the bug. This rather points to the effect of some disease which thrives during the moist warm weather. The disappearance of the spring brood cannot be due to the heavy rains destroying the eggs, because they are deposited behind the edges of the leaf sheaths, and the young also feed there to a considerable extent. This species was discovered by me at Orchard Siding ten years ago.

The Argentine Ant (*Iridomyrmex humilis*) has been abundant, and some time was given to it, but I have not thought of anything new in regard to methods of control. A great many people have enquired about it, and a weak arsenical sweet was recommended. This was usually secured from the nearest chemist, and when it was persistently used it reduced the ants to such an extent that they were not a nuisance; but enough survived to increase very rapidly as soon as the laying of poisoned sweet was stopped.

The Grape Bunch Spider.—This was the subject of complaint from Mr. Thatcher, Pinehurst, Constantia. It is a small spider that secretes itself in the bunches just as the bloom is dropping, and spins a very delicate web which entangles and holds the remains of the flowerlets as they drop, and thus gives the bunches a very untidy appearance when the fruit ripens. Mr. Thatcher makes a speciality of growing grapes for table purposes, and the web of this little spider spoils the otherwise fine appearance of the fruit. He has been hand-cleaning the infested bunches by having women go over them and remove the web by means of a long slender feather. I visited his place, and went into the matter carefully with him, but I was unable to suggest any better method than the one already adopted by him. If fumigation for Vine Mealy Bug during the winter months proves a success it may also destroy the winter stage of this spider.

The Pernicious Scale (*Aspidiotus perniciosus*) has not been found in this Province as yet. A number of people came in with specimens, which they thought were the "real thing," but in every case it proved to be something else.

Apple Bitter Rot in the Albany and Bathurst districts was the subject of special investigation on behalf of the plant pathologist, and a special report sent in accordingly.

Miscellaneous.—Formaldehyd Gas as a fumigant for seed potatoes was tested under your special direction, at the Cape Town Docks. A complaint from farmers that the fumigation at the Docks was injuring the growing power of the seed was also investigated. A special report was sent in dealing with the whole matter. A spray mixture, known by the commercial name "Sulphime" was tested at the Rosebank Station, White Peach Scale (*Diaspis pentagona*) being the insect concerned. So far as I could determine by a field test there was no difference between "Sulphime" and the lime-sulphur wash made according to the formula recommended by the office. There are a number of proprietary insecticides in hand, but I have not been able, with the limited staff at my command, to conduct any satisfactory tests.

The inspection of large consignments of fruit-tree stocks from overseas was given special attention whenever occasion required.

The judging of honey exhibits at agricultural shows came under my observation in a practical way at the Rosebank Show, at which I had the honour of acting as steward-in-charge. Several phases of the work seem open to improvement, and I hope to have a more satisfactory scheme worked out before next show season.

The vines in quarantine at Rosebank are given frequent attention from the entomological standpoint. The conditions are far from ideal for a quarantine station for vines, especially from the standpoint of plant diseases, and better arrangements should be made for this work.

Mr. W. W. Brighton-Manning left the service at the end of August to continue his studies in chemistry.

Additional assistance is needed at the Rosebank Station, in order that it may be developed to its highest state of usefulness. There is ample opportunity for work, but it is manifestly impossible for me to do all of it myself. So far I have managed to get on with one labourer. He is a capable boy, and is gradually becoming more and more useful as he gains experience.

(Sgd.) C. W. MALLY,

Cape Province Entomologist.

Cape Town,

20th June, 1913.

APPENDIX XIV.

DIVISION OF CHEMISTRY.

Report for period January 1st, 1912, to March 31st, 1913.

THE SECRETARY FOR AGRICULTURE.

I have the honour to submit my report on the work of the Division of Chemistry, at Pretoria during the period January 1st, 1912, to March 31st, 1913.

The staff throughout this period has consisted of:—

Chemist, H. J. Vipond.

Assistant, H. F. L. Bischoff.

On the termination of my original 3 years contract, on October 9th, 1912, I was appointed to the permanent staff as Chemist to the Department. On the 17th February, 1913, Mr. W. R. Murray was appointed as lay assistant at a salary of £5 per month. Provision was also made on the Estimates for the past financial year for an additional analyst.

I was absent on sick leave during the greater part of March and the whole of April, 1912, and owing to the work being very much in arrears, a start was made in reducing the burden of the soil analyses by restricting ourselves to the determination of only the most important ingredients, viz.:—Nitrogen, lime, available potash and available phosphoric acid. In a great many cases, also, only a rough hand and eye examination was made; this usually enabling us to advise the farmer with considerable certainty as to the requirements of the soil.

Although the total number of samples received during this period is less, proportionately, than during the two preceding periods, the work carried out includes two or three somewhat elaborate investigations on different points, i.e., the composition of different varieties of South African grown and imported maize (especially the constituents of the ash), the variation in the composition of the juice of citrus fruits budded on different stocks, and an investigation of the Weenen phosphate deposits.

PUBLICATIONS.

Report on the Weenen Phosphate deposits, by H. J. Vipond, Chemist, *Agricultural Journal*, February, 1913.

ANALYTICAL WORK.

The following is a list of the samples submitted for examination and report during the period.

Soils	...	...	...	...	...	...	...	...	183
Dairy products, etc.	...	...	...	...	...	...	...	...	25
Cave deposits (manurial)	...	...	...	...	...	...	...	...	5
Manures other than above	...	...	...	...	...	...	...	...	14
Lime and limestone	...	...	...	...	...	...	...	...	10
Minerals of Agricultural interest	...	...	...	...	...	...	...	...	39
Deposits, soil efflorescences, etc	...	...	...	...	...	...	...	...	4
Feeding Stuffs, grains, forage plants, etc.	...	...	...	...	...	...	...	...	17
Citrus Fruits	...	...	...	...	...	...	...	...	24
Miscellaneous plant products	...	...	...	...	...	...	...	...	12
Waters	...	...	...	...	...	...	...	...	24
Stomachs and ingesta of Stock	...	...	...	...	...	...	...	...	12
Dips	...	...	...	...	...	...	...	...	63
Insecticides and Fungicides	...	...	...	...	...	...	...	...	6
Miscellaneous	...	...	...	...	...	...	...	...	8
Total	...	...	...	...	...	...	...	...	446

SOILS.

Only 38 soils have been subjected to the full routine Chemical Analysis—so that a considerable reduction has been made in this branch of the work. Fifty-five have been subjected to a partial analysis, consisting of the determination of the more important constituents, viz.:—lime, magnesia, nitrogen, available potash and available phosphoric acid. 10 soils have been analysed for “alkali” or “brak,” and 4 for special single constituents.

Sixty-eight soils have been reported on (with advice regarding the manurial treatment required, etc.) from a rough physical examination only. A rough preliminary report, however, based on an examination of this kind, has been sent out in the case of practically every sample, whether subsequently analysed or not. This is done on account of the delay in carrying out these analyses, through our inability to cope with the large number received.

A start has also been made with the mechanical analyses of a large number of typical soils.

The average composition of the soils analysed during the period is as follows:—

	No. of Soils.	Average of all. %	Abnormal samples excluded.	Average of remainder. %
Stones	—	—	—	—
Composition of air-dry fine earth:—				
Moisture	38	2.25	nil.	2.25
Loss on Ignition	38	7.46	nil.	7.46
Insoluble matter	38	74.14	nil.	74.14
Iron Oxide and Alumina	38	15.34	nil.	15.34
Lime	92	.93	(3 with over 9% (6 " " 1%)	.18 .14)
Magnesia	52	.16	nil.	.16
Potash	38	.18	nil.	.18
Phosphoric Acid	38	.059	nil.	.059
		100 52		
Nitrogen	85	.122		.122
Available Potash	92	.0102		.0102
Available Phos. Acid	92	.0025	(6 with over .0100%)	.0015

This table scarcely differs from that of last year; the only point worth noting being the increase in the percentage of total and available potash.

The average percentage of nitrogen is fair, and those of lime and available phosphoric acid very low.

The subjoined tables give the data for all the soils analysed; classified in the same manner as in the last annual Report.

Table I. gives the analyses of 18 soils with good percentages of nitrogen (over .150 per cent.). Only 4 of these contain a sufficient amount of lime and they are soils of exceptional character. Nos. 2197 and 2198 are black vlei soils from the dolomite area of the Mooi River valley in the Potchefstroom District. They are exceptionally good soils. No. 2243 is another vlei soil of a much heavier character—also from a dolomite area in the Potchefstroom District, near Koeke-moer Siding. No. 2296 is of a type very common in its own locality. It is a grey "ash" soil from the neighbourhood of Zeerust, and consists largely of carbonate of lime, also derived from the dolomite.

The soils of this class contain on the average considerably more available phosphoric acid (.0049 per cent.) than the general run of our soils; taken individually, however, a number of them are quite as poor as any.

If we eliminate, besides the 4 already considered, the following:—

No. 2553 black peaty loam,

No. 2677c dark peaty loam,

No. 2439 dark brown heavy alluvial loam, rich in humus,

the remainder are more or less normal types of soil.

Nos. 2215 (ii), 2452, 2465, 2466, 2486 2677b, 2690, 2710, and 2719 are all, so far as one can judge, sedentary types from the Eastern Districts, and are characterised by deficiency in lime.

The fact they are if anything richer in available phosphates than the average soils of this kind seems due to the larger amount of organic matter they contain, which again, together with the lack of lime, is probably due to climatic conditions, principally, a higher rainfall with a good deal of mist.

No. 2465, from the neighbourhood of Pilgrim's Rest, is a typical sour heavy soil, giving a distinct acid reaction with litmus paper.

TABLE I.

Soils with Good Percentages of Nitrogen (*i.e.*, over 150%) (18 Soils).

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
No. of Soil.		2197	2198	2211	2215 (ii)	2243	2296	2439	2452	2465	2466	2486	2553	2607	2677b	2677c	2690	2710	2719
Stones		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Composition of air-dry Earth:—		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Moisture		7.65	4.64	3.18	3.77	3.92	—	—	—	—	—	—	—	—	—	—	—	2.48	2.68
Loss on Ignition		25.87	14.18	7.76	14.90	14.51	—	—	—	—	—	—	—	—	—	—	—	11.18	12.25
Insoluble Matter		52.13	68.17	84.60	48.62	61.78	—	—	—	—	—	—	—	—	—	—	—	56.81	59.50
Iron oxide and Alumina		11.56	11.14	3.43	33.10	9.16	—	—	—	—	—	—	—	—	—	—	—	29.63	25.30
Lime		1.82	1.46	.26	.02	9.08	49.60	.25	.05	.02	.06	.09	.07	.13	trace	.06	.10	.07	.02
Magnesia		.58	.49	.32	.09	.55	—	—	.06	—	—	—	—	—	—	—	—	.04	.04
Potash		.17	.11	.24	.05	.16	—	—	—	—	—	—	—	—	—	—	—	.20	.20
Phosphoric Acid		.19	.11	.05	.03	.07	—	—	—	—	—	—	—	—	—	—	—	.10	.08
Total		99.97	100.30	99.84	100.58	99.23	—	—	—	—	—	—	—	—	—	—	—	100.51	100.07
Nitrogen		.888	.447	.171	.168	.232	.263	.203	.175	.280	.158	.209	.350	.154	.154	.337	.165	.160	.190
Available Potash		.0021	.0025	.0108	.0036	—	—	.0135	.0047	.0167	.0219	.0246	.0031	.0036	.0050	.0076	.0161	.0136	.0010
Available Phosphoric Acid		.0136	.0148	.0022	.0024	—	—	.0046	.0063	.0022	.0032	.0037	.0060	.0028	.0016	.0122	.0009	.0008	.0009

- (1) Dark powdery, peaty soil, Turffontein 623, Potchefstroom District.
 (2) Black medium, peaty loam, Turffontein 623, Potchefstroom District.
 (3) Dark coloured, heavy loam, Sypherfontein 33, Pretoria District.
 (4) Brown medium loam, Penvaan, Vryheid, Natal.
 (5) Black heavy loam ("turf"), Hartbeestfontein 573, Potchefstroom District.
 (6) Grey powdery, medium loam ("ash" soil), Kameeldoorn 58, Marico.
 (7) Dark brown, rather heavy loam, Sterkspruit, P.O. Heesterspruit, Barberton.
 (8) Chocolate coloured, rather heavy loam, Silverfontein 2075, Zoutpansberg.
 (9) Brown, heavy loam, Geelhoutboom 250, Lydenburg.
 (10) Greyish, medium loam, Legogot, White River, Barberton.
 (11) Grey clay loam, Wakkersroom.
 (12) Black medium, peaty loam, Goodhope 378, Middelburg.
 (13) Dark-grey, fine-grained medium loam, Middelburg.
 (14) Dark brown, sandy loam, Uitkomst 138, Carolina.
 (15) Dark coloured, light, rather peaty loam, Uitkomst 138, Carolina.
 (16) Reddish-brown, heavy soil, Dumerin, Stegi, Swaziland.
 (17) Brown, rather heavy loam, Forestry Station, Belfast, Lydenburg District.
 (18) Greyish-brown medium loam, Forestry Station, Belfast, Lydenburg District.

Table II. gives the analyses of nine soils with good percentages of lime (*i.e.*, 40 per cent. and over) in addition to the four falling in the 1st group. They are also characterised by a higher average percentage of available phosphoric acid (.0051 per cent.).

Nos. 2190, 2191 and 2193, all from alluvial bench land on the Vaal River below Vereeniging, are heavy, tenacious black or greyish black soils—fairly rich in all the elements of plant food. (Some of these soils were found to contain "alkali", further references being made to them under that heading.

No. 2310, from the Springbok Flats, is a red, rather sandy loam, underlain by a deposit of secondary surface limestone.

No. 2245 is a heavy vlei soil from a dolomite area near Koekemoer, in the Potchefstroom district.

No. 2311 is a heavy black turf from the Springbok Flats.

No. 2387 is a similar soil from Wakkerstroom District.

The remaining two are more or less normal types.

TABLE II.

Soils with Good Percentages of Lime (*i.e.*, 40 % and over) (9 Soils).

No. of Soil.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	RE
2190	2191	2193	2245	2310	2311	2387	2448	2498		
Stones	%	%	%	%	%	%	%	%		
Composition of Air-dry										
Fine Earth :—										
Moisture	2.70	2.43	3.20	1.81						
Loss on Ignition ..	4.74	5.33	5.01	4.88						
Insoluble matter ..	81.56	81.43	79.56	84.75						
Iron oxide and Alumina	9.71	9.57	10.68	6.73						
Lime .. .. .	.61	.55	.66	.98	1.12	.75	.40	.41		
Magnesia .. ..	.32	.22	.35	.53			.11			
Potash .. .. .	.24	.25	.21	.21						
Phosphoric Acid ..	.09	.06	.05	.02						
Total	99.97	99.84	99.72	99.91						
Nitrogen .. ..	.108	.119	.105	.076	.067	.115	.141	.087		
Available Potash ..	.0034	.0041	.0047	.0056	.0177	.0112	.0177	.0116		
Available Phosphoric Acid	.0149	.0112	.0070	.0020	.0012	.0021	.0039	.0016		

(1, 2 and 3) Dark grey, heavy alluvial loam, Klein Leeuwkuil 334, Heidelberg.
 (4) Dark, heavy loam ("turf"), Haartebeestfontein 573, Potchefstroom.
 (5) Red, rather sandy loam, Roodekuil 1728, Waterberg.
 (6) Black, heavy turf, Roodekuil 1728, Waterberg.
 (7) Black, heavy turf, Rooipoort 119, Wakkerstroom.
 (8) Dark-brown, heavy loam, Westfalia Estate, Zoutpansberg.
 (9) Brownish-grey, sandy loam, Longsloot 76, Bethal.

Table III gives the analyses of 19 Clay soils to heavy loams.
Their most noticeable characteristics are lack of lime and available phosphates.
The percentages of nitrogen are moderate for soils of this class. Those which go over .130 per cent. may be considered good. The average is .119 per cent. The percentages of available potash are, generally speaking, good—only 4 falling below .0050 per cent.

TABLE III.																				
Clay Soils to Heavy Loams (19 Soils).																				
No. of Soil.		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
2203	2215 (iii)	2229	2257	2279	2280	2283	2366	2407	2422	2438	2445	2450	2608	2691	2692	2693	2715	2721		
%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
—	—	—	20.00	0.40	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2.82	1.96	—	1.01	3.15	2.73	6.59	3.51	—	—	—	—	—	—	2.04	1.74	2.40	—	—	—	—
8.38	7.84	—	4.44	8.49	7.93	9.99	9.15	—	—	—	—	—	—	9.24	9.39	9.47	—	—	—	—
68.84	69.74	—	77.98	60.69	66.71	53.59	50.79	—	—	—	—	—	—	72.13	69.99	68.63	—	—	—	—
19.74	19.83	—	15.53	27.22	22.75	29.39	36.12	—	—	—	—	—	—	16.36	18.30	19.06	—	—	—	—
.17	.03	.19	.14	.08	.09	.11	.20	.13	.21	.25	.10	.08	.17	.05	.08	.11	.02	.04	—	—
—	—	—	.21	.16	.11	.16	.14	—	—	—	.07	.11	—	.06	.03	.03	.14	.07	—	—
—	—	—	.42	.25	.17	.09	.10	—	—	—	—	—	—	.35	.40	.37	—	—	—	—
—	—	—	.07	.06	.05	.06	.03	—	—	—	—	—	—	.09	.10	.09	—	—	—	—
100.56	100.04	—	99.80	100.10	100.34	99.98	100.04	—	—	—	—	—	—	100.32	100.03	100.16	—	—	—	—
.111	.092	.133	.057	.101	.099	.102	.127	.110	.129	.139	.148	.108	.129	.150	.140	.143	—	—	—	—
.0124	.0059	.0019	.0065	.0168	.0151	.0002	.0090	.0031	.0137	.0077	.0317	.0127	.0245	.0090	.0114	.0105	.0071	.0033	—	—
.0010	.0009	.0007	.0005	.0005	.0006	.0007	.0008	.0006	.0007	.0018	.0057	.0014	.0004	.0009	.0006	.0006	.0004	.0006	.0006	.0006
Total																				
Nitrogen																				
Available Potash																				
Available Phosphoric Acid																				
(1) Uitzicht 586, Pretoria, brown heavy loam.																				
(2) Penvaan, Vryheid, Natal, brown clay loam.																				
(3) Bronkhorstfontein 177, Pretoria, brown heavy loam.																				
(4) Rhenosterfontein 83, Marico, reddish-brown heavy clay loam.																				
(5) Vaalbank 98, Krugersdorp, dark red heavy loam.																				
(6) Vaalbank 98, Krugersdorp, dark red heavy loam.																				
(7) Hartley, Rhodesia, red heavy loam.																				
(8) Pyramids 370, Pretoria, dark reddish-brown heavy loam.																				
(9) Rustfontein 401, Pretoria, dark brown heavy loam.																				
(10) Vygenhoek 1194, Lydenburg, reddish brown heavy loam.																				
(11) Sterkspruit, Barberton, P.O. Hectorspruit, chocolate coloured heavy loam.																				
(12) Westfalia Estate, Zoutpansberg, reddish heavy loam.																				
(13) Westfalia Estate, Zoutpansberg, reddish brown heavy loam.																				
(14) Middelburg, reddish heavy loam.																				
(15) Groenkloof 419, Pretoria, yellowish brown heavy loam.																				
(16) Groenkloof 419, Pretoria, red and brown (mixed) heavy loam.																				
(17) Groenkloof 419, Pretoria, red and brown (mixed) heavy loam.																				
(18) Forest Station, Belfast, Lydenburg (3rd ft.), bright red heavy loam.																				
(19) Forest Station, Belfast, Lydenburg (3rd ft.), yellowish heavy loam.																				

Table IV. gives the analyses of 22 medium to light loams. These show the usual deficiency in lime and available phosphates. The average percentage of nitrogen is .090 per cent. Anything over .115 per cent. may be considered good. The percentages of available potash appear to be uniformly good. Six of these are subsoils from the Forestry Station, Belfast.

TABLE IV.
Medium to Light Loams—(22 Soils).

No. of Soil.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
2185	2212	2215	2271	2288	2397	2443	2444	2453	2469	2480	2495	2496	2497	2677a	2705	2711	2712	2713	2714	2718	2720	
Stones	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Composition of Air-dry																						
Fine Earth:—																						
Moisture ..	1.15	2.40	5.20	.97	.74	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Loss on Ignition ..	6.78	6.20	12.54	2.95	3.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Insoluble matter ..	74.39	74.34	44.12	88.69	87.36	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Iron oxide and Alumina ..	17.43	16.65	37.56	7.19	8.50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Lime ..	.09	.13	.22	.03	.09	.05	.12	.06	—	.30	.10	.15	.22	trace	.21	.02	.01	trace	.01	.03	.01	.01
Magnesia ..	.11	.27	.10	.08	.19	—	—	.11	—	—	—	—	—	—	.26	.10	.09	.07	.08	.06	.05	.05
Potash ..	.08	.14	.10	.10	.24	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Phosphoric Acid ..	.08	.05	.07	.04	.03	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total ..	100.11	100.18	99.91	100.05	100.16	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Nitrogen ..	.087	.127	.106	.057	.039	.077	.062	.126	.048	.097	.077	.118	.102	.134	—	—	—	.129	—	—	—	—
Available Potash ..	.0113	.0072	.0070	.0104	.0063	.0153	.0236	.0097	.0052	.0067	.0289	.0188	.0366	.0064	—	.0116	.0057	.0079	.0167	.0036	.0071	.0071
Available Phosphoric Acid ..	.0006	.0028	.0009	.0005	.0004	.0004	.0026	.0038	.0004	.0013	.0010	.0010	.0210	.0013	—	.0005	.0003	.0012	.0004	.0004	.0004	.0004

- (1) Hamaboya 2350, Zoutpausberg, reddish brown medium loam.
 (2) Sypherfontein 33, Pretoria, dark brown medium loam.
 (3) Fenvaan, Vryheid, Natal, reddish brown medium loam.
 (4) Palmietfontein 677, Potchefstroom, reddish light loam.
 (5) Uitrkijk 1793, Waterberg, red medium loam.
 (6) Casteel 360, Lydenburg, dark greyish brown medium loam.
 (7) Drielaagte 1001, Rustenburg, brownish red medium loam.
 (8) Drielaagte 1001, Rustenburg, brownish red light loam.
 (9) Silverfontein 2075, Zoutpausberg, greyish medium loam.
 (10) Pretoria, reddish brown light loam.
 (11) Rooikop 115, Witwatersrand, blackish medium loam.
 (12) Leeuwfontein 87, Standerton, grey medium loam.
 (13) Langsloot 76, Bethal, dark red, rather heavy loam.
 (14) Langsloot 76, Bethal, dark greyish brown medium loam.
 (15) Uitrkijk 138, Carolina, reddish brown light loam.
 (16) Umhlungwa, S. Coast, Natal, black medium loam.
 (17) Forest Station, Belfast, Lydenburg (2nd ft.), light brown, rather heavy loam.
 (18) Forest Station, Belfast, Lydenburg (3rd ft.), bright reddish brown, rather heavy loam.
 (19) Forest Station, Belfast, Lydenburg (1st ft.), dark red, light loam.
 (20) Forest Station, Belfast, Lydenburg (2nd ft.), dark red light loam.
 (21) Forest Station, Belfast, Lydenburg (3rd ft.), brown medium loam.
 (22) Forest Station, Belfast, Lydenburg (2nd ft.), yellowish, rather heavy loam.

Table V. gives the analyses of 27 sandy loams to sandy soils. The percentages of lime are almost, without exception, very low—the average being .07 per cent., and the available phosphoric acid, with one peculiar exception, is very low indeed.

The exception, No. 2286, is from a citrus orchard in the Rustenburg district, and is taken from a patch on which the trees do very badly. It was found to contain an appreciable quantity of soluble saline matter; the site was said to have been that of an old cattle kraal. The percentages of available potash, notwithstanding the sandy texture of these soils, are pretty good—only 6 falling below .0050 per cent.

The nitrogen percentages average .053 per cent., which is very low indeed.

TABLE V.
Sandy Loams and Sandy Soils (27 Soils).

No. of Soil.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)
2186	2240	2241	2242	2244	2267	2268	2286	2292	2293	2394	2395	2396	2398	2406	2436	2437	2459	2460	2467	2468	2481	2482	2554	2609	2716	2717	
Stones	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	
Composition of Air-dry Fine Earth :	1.0	—	—	—	9.1	7.0	—	2.80	0.40	—	—	—	.20	—	—	—	—	—	—	—	—	—	—	—	—	—	
Moisture . . . . .	.39	.31	.54	.81	.51	.69	—	.33	.59	—	—	—	.55	—	—	—	—	—	—	—	—	—	—	—	1.20	—
Loss on Ignition . . .	2.90	3.24	3.74	4.26	2.15	3.93	4.02	2.14	3.43	—	—	—	1.74	—	—	—	—	—	—	—	—	—	—	—	6.63	—	
Insoluble Matter . . .	91.10	88.37	86.47	86.14	91.25	87.17	88.64	93.72	88.18	—	—	—	93.30	—	—	—	—	—	—	—	—	—	—	—	72.24	—	
Iron oxide & Alumina .	5.65	7.80	8.90	8.80	5.38	8.23	6.60	3.44	7.15	—	—	—	3.95	—	—	—	—	—	—	—	—	—	—	—	19.94	—	
Lime . . . . .	.07	.09	.07	.09	.10	.03	.03	.02	.03	.05	.10	.10	.34	.05	.03	.01	.05	.07	—	—	.06	.06	.08	.05	.02	.01
Magnesia . . . . .	.05	.09	.14	.13	.15	.09	.08	.08	.07	—	—	—	.16	—	—	—	—	—	—	—	—	—	—	—	.05	.08
Potash . . . . .	.05	.12	.15	.22	.11	.19	.16	.07	.07	—	—	—	.10	—	—	—	—	—	—	—	—	—	—	—	.11	—
Phosphoric Acid . . .	.03	.03	.03	.03	.02	.02	.03	.04	.05	—	—	—	.03	—	—	—	—	—	—	—	—	—	—	—	.09	—
Total	100.24	100.05	100.07	100.48	99.67	100.37	100.25	99.84	99.57	—	—	—	100.20	—	—	—	—	—	—	—	—	—	—	—	100.28	—	
Nitrogen . . . . .	.053	.036	.057	.067	.036	.055	.073	.053	.066	.055	.050	.029	.039	.039	.039	.042	.029	.038	.050	.048	.067	.076	.090	.066	.081	—
Available Potash . . .	.0050	.0064	.0139	.0160	.0086	.0117	.0159	.0055	.0093	.0068	.0070	.0021	.0122	.0071	.0108	.0075	.0025	.0022	.0086	.0081	.0053	.0199	.0041	.0118	.0047	.0043
„ Phosphoric Acid . .	.0008	.0005	.0006	.0007	.0004	.0005	.0011	.0257	.0009	.0010	.0008	.0012	.0007	.0007	.0006	.0009	.0002	.0003	.0006	.0005	.0005	.0008	.0009	.0014	.0009	.0004	

- (1) Hamaboya 2350, Zoutpansberg, greyish light sandy loam.
 (2) Haartebeestfontein 373, Potcheitroom, red light sandy soil.
 (3) Haartebeestfontein 573, Potcheitroom, reddish sandy loam.
 (4) Haartebeestfontein 573, Potcheitroom, brown sandy loam.
 (5) Haartebeestfontein 573, Potcheitroom, reddish brown sandy loam.
 (6) Boskop 77, Krugersdorp, light brown sandy or gravelly loam.
 (7) Boskop 77, Krugersdorp, brownish-grey sandy or gravelly loam.
 (8) Zuurplaats 822, Rustenburg, greyish sandy loam.
 (9) Schoonord 430, Middelburg, greyish sandy loam.
 (10) Schoonord 430, Middelburg, brown sandy loam.
 (11) (12) and (13) Casteel 360, Lydenburg, dark brown sandy soil.
 (14) Syfergat 44, Wolmaranstad, brown fine-grained sandy loam.
 (15) Rustfontein 401, Pretoria, red sandy loam.
 (16) Nooitgedacht 458, Pretoria, brown sandy soil.
 (17) Nooitgedacht 458, Pretoria, grey sandy soil.
 (18) and (19) Tweefontein 1553, Waterberg, red, fine-grained sandy loam.
 (20) Pretoria, brown sandy loam.
 (21) Pretoria, yellowish-brown, rather sandy loam.
 (22) and (23) Rookop 115, Witwatersrand, brown sandy loam.
 (24) Viakfontein 50, Witwatersrand, brownish-grey, fine-grained sandy loam.
 (25) Middelburg, red sandy loam.
 (26) Forest Station, Belfast, Lydenburg (1st ft.), brown, rather sandy loam.
 (27) Forest Station, Belfast, Lydenburg (2nd ft.), yellowish-brown sandy loam.

"ALKALI" OR "BRACK" IN SOILS.

10 Samples were examined for Soluble Salts. The results being given below:—

	1	2	3	4	5	6	7	8	9	10
No. of Sample.	2191 %	2192 %	2193 %	2194 %	2286 %	2459 %	2460 %	2504 %	2618 %	2621 %
Chlorine	·010	·010	·008	·009	·004	·009	·010	·011	·009	·035
Sulphuric Acid	·003	·005	trace	trace	·010	trace	trace	trace	—	·020
"Black Alkali"	·054	·083	·035	·137	·010	—	—	·034	nil	nil
Normal Sodium Carbonate	·013	·021	nil	trace	nil	—	—	nil	—	—

1. Dark grey heavy alluvial soil, Klein Leeuwkuil 334, Vereeniging Estates Limited.

2. " " " " " "

3. " " " " " "

1. 5. Zuurplaats 822, Rustenburg, brownish grey, gravelly loam from a barren spot in a Citrus Orchard.

6. Tweefontein 1553, Warmbaths, Waterberg District, red sandy loams.

7. 8. Wolfhuis 224, P.O. Dean, Klerksdorp. Greyish heavy alluvial loam.

9. Blesbokspruit, Piet Retief. Greyish brown medium loam.

10. Belle ombre, Pretoria.

The only cases which, to my mind, call for notice, are those of Nos. 2191, 2192, 2193, 2194 and 2504. They are all from the Vaal River, and represent flat alluvial bench land; their texture in all cases being fine grained. No. 2191 is from land that had been irrigated from the Vaal River for 12 months or so. Young wheat plants showed very uneven growth, with tops blighted. No. 2192 had been similarly irrigated, and was taken from a patch where old-established lucerne had died off. No. 2193 was from a neighbouring spot where lucerne was growing well. It represents the top foot of soil. No. 2194 represents the second foot from the same spot. No. 2504 is from uncultivated land on the Vaal River, further down, near Klerksdorp.

All of these soils contain considerable amounts of black alkali (sodium carbonate and bicarbonate) and in addition a smaller amount of sodium chloride. So far as the top foot of soil is concerned, the amount of sodium carbonate in those places where crops have sustained visible injury is greater than in the place where the lucerne is still growing well. The second foot from the latter place, however, shows the highest percentage of black alkali. This is quite in accordance with general experience, that black alkali does the greatest harm only when it accumulates near the surface. Continuous irrigation in badly drained soils like these is almost certain, sooner or later, to bring it to the top, unless artificial drainage is resorted to. It is not unlikely that these conditions are more or less general along the Vaal, as soils of similar type and situation are very common right along its course and irrigation from the river presents itself as a comparatively easy matter. I think that "alkali" in soils in the Transvaal is only likely to become a serious matter where excessive irrigation is practised on unsuitable types of soil without artificial drainage.

DAIRY PRODUCTS, ETC.

These include

Milk	5 samples.
Cream	5 "
Butter	8 "
Cheese	3 "
Preservatives, etc.	4 "

—
25
—

The analyses were carried out on behalf of the Division of Dairying.

CAVE DEPOSITS.

The analyses of 3 samples are given below.

No.	Per cent. 2440	Per cent. 2508	Per cent. 2610
Stones	14.1	10.0	
Potash	1.08	·02	
Phosphoric acid	10.02	5.99	8.94
Nitrogen	1.14	1.83	3.71

One sample was of no manurial value, but contained a considerable amount of brown Manganese dioxide, such as is often met with in the dolomite formation. Another sample submitted as bat guano was mainly ashes.

MANURES.

These include:—

(a) Artificial Manures:—						No. of Samples.
Superphosphate	...	...	...	...	...	1
Mixed Manure	...	...	...	...	...	1
Basic Slag	...	...	...	...	...	3
Mixed Bone and Meat-meal	...	...	...	...	...	2
Whale Guano	...	...	...	...	...	1
Guano	...	...	...	...	...	1
Total						9
(b) Miscellaneous Manures:—						
Night Soil	...	...	...	...	...	1
Soot	...	...	...	...	...	1
Sheep Manure	...	...	...	...	...	1
Manure said to be made from prickly-pear refuse...	...	...	...	...	...	1
Total						4

The following figures are probably of interest:—

	Night Soil. %	Soot. %	Sheep Manure. %	Prickly Pear Refuse. %	Bone and Meat Meal. %	Whale Guano. %
Phosphoric Acid :						
(a) Water-soluble ..	—	—	—	—	—	—
(b) Citric-acid-soluble	—	—	—	—	13.76	—
(c) Total .. ..	.78	—	.81	.84	18.18	7.34
Potash .. ..	.09	—	5.31	3.92	—	—
Nitrogen	1.96	.35	2.10	2.64	7.06	9.94
Moisture	15.80	—	5.59	6.34	—	—
Organic Matter ..	—	—	45.45	60.08	—	—

The mixed bone and meat meal was manufactured by a Johannesburg firm.

LIMES AND LIMESTONES.

These include:—

Commercial Lime	...	...	...	...	4 samples.
Refuse Lime	...	...	...	...	2 "
Limestone Rock	...	...	...	...	1 "
Soft Surface Limestone	...	...	...	...	3 "

Only two of these are of interest—one a sample of soft white surface limestone from Weenen, Natal, containing 81 per cent. Calcium carbonate, and the other a sample of similar nature from the neighbourhood of Ottos Hoop, but containing 34 per cent. Magnesium carbonate, and only 50 per cent. calcium carbonate. Material of this kind of fairly good quality, like the Weenen sample, would be extremely valuable when ground and applied to the soil, especially the lighter types.

MINERALS OF AGRICULTURAL INTEREST.

These include:—34 samples of phosphatic rock from the neighbourhood of Weenen, Natal, and one sample of crude powdery pyrolusite (manganese dioxide) from the dolomite. Of the Weenen phosphate samples, 22 analyses representing all these beds which I examined and sampled to my own satisfaction, have been published in the *Agricultural Journal* for February, 1913. The remainder, which were either taken casually by myself or received from private persons, are of interest as indicating the possibilities of the phosphate deposits in that locality, only 4 are of any importance.

No. of Sample.	2658.	2659.	2660.	2703.
Moisture and Loss on Ignition ..	8.01	10.92	6.07	—
Insoluble matter	1.74	15.95	34.51	—
*Phosphoric Acid	34.25	25.26	17.39	12.35
Lime	50.20	43.62	26.55	—
Iron Oxide and Alumina	2.85	2.14	12.91	13.52
Total	97.05	97.89	97.43	—
*Equal to Calcium Phosphate ..	75.34	55.45	38.25	26.9

Nos. 2658 and 2659 are "wood" phosphate, soft and hard, respectively.

No. 2660 is a hard, blackish rock which breaks up into more or less cubical blocks.

No. 2703 is a rather tough grey rock.

GRAINS, MISCELLANEOUS FEEDING STUFFS, ETC.

Maize bran (mill waste)	1 sample.
Palmkernel Cake (manufactured by Lever Bros, Durban)	1 „
Miscellaneous feeding stuffs made from the prickly pear	4 „
Total	6 samples.

	Maize Bran (waste).	Palm- kernel Cake.	Prickly-pear feeding stuffs.			
			1	2	3	4
	%	%	%	%	%	%
Moisture	—	6·31	5·76	8·22	6·33	5·22
*Ash	2·67	3·78	19·72	14·61	20·20	32·27
Protein	8·97	16·98	5·22	2·95	4·72	3·78
Fat	·10	9·84	55·89	66·89	57·59	48·41
Carbohydrates ..	—	37·39	13·41	7·33	11·16	10·32
Fibre	—	25·70				
	100·00	100·00	100·00	100·00	100·00	100·00
*Including sand and in- soluble silica ..	·10	—	3·30	1·66	·63	2·26
Albuminoid ratio ..	—	1·3·6	1:10·7	1:22·7	1:12·2	1:12·8

The sample of maize “waste” as it is called, was submitted as a manure, but as its manurial value is not very great, and as it seems to be free from earthy impurity, I thought it could be best utilised as a feeding stuff.

The palm-kernel cake is a trifle higher in fibre than the average European samples, it is nevertheless a valuable feeding stuff, and an account of its narrow albuminoid ratio is specially suitable for dairy stock for which purpose it is chiefly employed in Europe. The prickly pear feeding stuffs scarcely merit attention, as although low in fibre, they are excessively high in ash and low in protein. Their value is low and their cost of manufacture probably high.

FORAGE PLANTS.

	1	2	3	4	5	6
	Teff Hay.	American Aloe.	Lotonis trichopoda.	Cadaba juncea.		Ipomoea crassipes.
				(a)	(b)	
Moisture	% 6·51	% 86·50	% 29·5	% 14·06	% 11·52	% 12·23
Ash	7·85	2·02	10·90	7·93	8·40	8·77
Protein	7·07	1·10	6·42	13·75	12·40	10·90
Fat	·97	·30	1·12	1·15	1·76	3·92
Carbohydrates ..	47·87	7·71	35·06	36·40	31·60	41·10
Fibre	29·73	2·37	17·00	26·80	34·75	23·17
	100·00	100·00	100·00	100·00	100·00	100·00
The ash includes :						
Silica	4·22	·02	1·26	·09	·07	·63
Lime	·30	·77	4·66	2·54	3·25	2·52
Magnesia	·26	·34	·46	·09	·17	·54
Sulphuric Acid ..	·21	trace	·11	2·19	·88	·26
Phosphoric Acid ..	·19	·09	·21	·30	·17	·83
Albuminoid ratio ..	1:6·9	1:7·3	1:5·6	1:2·7	1:2·7	1:4·1

The feeding value of teff hay has been the subject of numerous enquiries from stock farmers, particularly, I think, from horse breeders. It shows the usual character of gramineous hays coupled with a moderate amount of crude fibre and freedom from dust. Its chief defects, which are common to the grasses, are a rather wide albuminoid ratio and rather low percentage of lime in the ash. For growing stock a sole diet of teff hay would hardly be suitable.

The American aloe seems to have attracted attention as a possible ostrich food.

So far as the feeding value is concerned, it is fairly good, being low in fibre as compared with the average run of non-succulent forage plants and higher in dry matter than the average succulent crops, such as roots, pumpkins, prickly pear, etc.

Lotonis trichopoda is a wild plant from Knysna. In this case the thicker woody portions of the plant, amounting to 25 per cent. of the sample were rejected. The remainder, as analysed, shows a low figure for fibre, and a suitable albuminoid ratio. The ash is very rich in lime.

The other two plants, *Cadaba juncea*, (*a*) young growth, and (*b*) six months' growth), and *Ipomoea crassipes*, are from the Springbok Flats, and are said to be keenly relished by cattle. They are all fairly rich in nitrogenous constituents and lime. The presence of abundance of lime in the plant may, however, indicate that it can only flourish on a calcareous soil.

The analyses of these 6 forage plants were carried out on behalf of the Botanist.

ANALYSIS OF MAIZE SAMPLES IN CONNECTION WITH THE FEEDING OF MINE NATIVES.

In this connection we were asked by Dr. Macaulay, M.L.A., of Cleveland, to undertake an investigation into the feeding values of different varieties of Maize. 27 samples were supplied by the Botanist and determinations of the moisture protein and ash, and of lime, magnesia, sulphuric acid and phosphoric acid, in the latter were made. The figures are given in the annexed table. Although they do not reveal any new feature, they show what variations may be expected. The figures for protein are of agricultural interest, as they show the marked superiority of the flint over the dent varieties. The poverty of maize grain in lime is also very strikingly shown.

Record No.	Name of Breed.	Origin.	Received.	Chemistry Division No.	Moisture. %	Protein. %	Ash. %	Lime. %	Magnesia. %	Sulphuric Acid. %	Phosphoric Acid. %
501/11	Hickory King ..	W. P. Bosse, Richmond Natal ..	6/9/11	2328	8.57	9.71	1.26	trace	not deter- mined	.06	.60
489/11	" ..	J. Moon, Manderston, Natal ..	1/9/11	2329	8.15	9.98	1.29	"	"	.05	.62
571/11	" ..	M. Geerdts, Schapenrust, Transvaal ..	27/9/11	2330	8.25	10.15	1.09	"	.19	.04	.51
553/11	Iowa Silver Mine ..	Experimental Farm, Potchefstroom ..	5/10/11	2331	8.24	9.63	1.17	"	.21	.02	.50
502/11	Natal White Horsetooth ..	W. P. Bosse, Richmond, Natal ..	6/9/11	2332	9.08	9.36	1.20	"	.20	.04	.58
504/11	Golden Beauty ..	" ..	6/9/11	2333	9.04	9.98	1.22	"	.20	.04	.63
503/11	Yellow Horsetooth ..	" ..	6/9/11	2334	8.70	10.06	1.23	"	.22	.02	.57
580/10	German Yellow ..	J. W. Flett, Craigside, Natal ..	12/9/10	2335	8.63	9.36	1.23	"	.19	.03	.62
624/10	Sheep Tooth ..	Bright & Pallister, Buffelspoort, Transvaal ..	29/9/10	2336	8.41	10.06	1.29	"	.21	trace	.62
382/11	Chester County Mammoth ..	C. F. Stallard, Nancefield, Johannesburg, Transvaal ..	8/6/11	2337	8.08	8.58	.94	"	.20	.01	.42
543/11	Eureka ..	M. Geerdts, Schapenrust, Transvaal ..	27/9/11	2338	8.28	9.19	1.08	"	.20	.06	.47
457/11	Wills Gehu ..	Oscar Wills & Co., U.S.A. ..	2/8/11	2339	8.27	11.11	1.40	"	.27	.04	.69
497/11	" ..	Pullen, Schuurveberg, Pretoria ..	1/9/11	2340	8.06	11.55	1.14	"	.23	.03	.52
496/11	Wills Dakota ..	" ..	1/9/11	2341	7.61	11.29	1.04	"	.19	.05	.45
402/11	Reid's Yellow Dent ..	Vogler & Sons, U.S.A. ..	21/16/11	2342	8.82	9.36	1.33	"	.22	.01	.64
508/11	Boone County ..	Archibald & Co., Umzinto, Natal ..	11/9/11	2343	8.01	9.84	1.12	"	.20	.02	.48
552/11	Yellow Hogan ..	W. A. McLaren, Vereeniging ..	3/10/11	2344	8.19	9.71	1.24	"	.23	.03	.62
573/11	Chester County Mammoth ..	S. J. Hyde, Leeuwdoorns, Wolmaransstad ..	30/8/11	2345	8.12	9.58	.94	"	.19	.02	.39
468/11	Argentine Maize ..	Skinner's Court, Pretoria ..	12/8/11	2346	7.98	8.23	1.42	"	.25	.01	.69
767/11	Cinquantina ..	Vilmorin & Co., France ..	28/12/10	2347	8.05	12.95	1.48	"	.29	.04	.79
483/11	White Botan ..	Fleming, Leeuwdoorns, Wolmaransstad ..	21/8/11	2348	7.94	12.69	1.10	"	.23	.01	.44
574/11	Virginia Horsetooth ..	P. C. Bezuidenhout, Kammeeldrift, Pretoria ..	21/8/11	2349	7.96	10.84	1.51	"	.22	.02	.67
—	Mealie Meal ..	Horstall, Aliwal North, C.P. ..	—	2350	8.70	8.71	1.07	"	.20	.02	.49
—	White Congo ..	Cullinan, England, Vryburg D. ..	—	2377	7.67	11.64	1.22	"	.23	.03	.56
—	Yellow Congo ..	" ..	—	2378	7.55	10.76	1.04	"	.21	.01	.44
—	German Yellow ..	" ..	—	2379	7.56	10.93	1.37	"	.23	.04	.51
—	Eureka ..	" ..	—	2380	7.19	10.15	1.09	"	.25	.02	.63

Determinations of acidity and sugar content of the juice were made in the case of 24 samples of citrus fruits, one sample of each variety from trees budded on orange and one on lemon stocks. The analyses were made on behalf of the Division of Horticulture.

The General Secretary of the South African National Union, on behalf of Mr. W. Frost, Graaff-Reinet, forwarded a large number of samples of materials of different kinds produced from the prickly pear.

They include such things as fertilisers, feeding stuffs, vinegar, coffee, fibre, yeast, syrups, etc.

Nos. 2476 and 2500 were received from the Director of Veterinary Research in connection with investigations on Stiff-sickness. Nos. 2484, 2602, 2632, 2685, 2689, 2695, 2777 are all suitable for either irrigation or boiler use. No. 2674, although it contains a fair amount of sodium bicarbonate, is still, I think, well within the required limits of purity for either of these purposes. These eight waters represent a very common type characterised by the presence of more or less silica; the bicarbonates of calcium and magnesium with a smaller amount of sodium bicarbonate and usually a little sodium chloride; sulphates being generally absent.

Nos. 2672, 2746, 2747 and 2748 are all from the same source, viz., the Cornelia Colliery, Vereeniging, and are required for irrigation. They all, however, contain considerable amounts of common salt and carbonate of soda.

Nos. 2672 and 2748 would be distinctly dangerous on anything but an open, well-drained soil. Nos. 2746 and 2747 would also, I think, be dangerous on a poorly drained, heavy soil.

STOMACHS AND INGESTA OF STOCK (POISONING, ETC.).

Examinations of a number of specimens of this description were undertaken for the Veterinary and Veterinary Research Divisions.

DIPS.

These include—

Dip stuffs, 9,
Dipping tank fluid, 55,

and were mostly from the Veterinary Division.

INSECTICIDES AND FUNGICIDES.

Six samples were analysed on behalf of the Entomology Division.

CORRESPONDENCE, INTERVIEWS, TRAVELLING, ETC.

The correspondence, both as regards quantity and character, remains very much the same as before.

Very little travelling has been done during the period under report. Owing to my absence on sick leave during March and April 1912, this Division was only represented at two Shows, viz., Johannesburg and Pretoria. In October last I paid a visit of about nine days to Weenen, Natal, in order to collect samples from the phosphate deposits to which reference has already been made. An exhibit was made by this Division at the Johannesburg Show in March this year.

FIELD EXPERIMENTS.

Two Manurial experiments on a fairly large scale were carried out during the season 1911-12. One was the continuation of the experiment at Koedoespoort, near Pretoria, under Mr. Weir's supervision, and the other was carried out by Mr. Pilkington, of Leeuwdoorns, Maquassi, Wolmaransstad district. The results of both these trials have been published in the "Agricultural Journal" for October, 1912.

The experiment at Leeuwdoorns was characterised by low yields and low increases from manures; due largely, no doubt, to the very low rainfall (12.46 inches, of which only 9.45 are to be reckoned as effective). The highest yield resulted from the application of 10 tons of farmyard manure per acre, but even this only gave 1,295 lbs. of maize per acre, as against 650 lbs. from the unmanured plot. Analysis of the soil showed a lack of phosphates and nitrogen.

The experiment at Koedoespoort, in spite of a dry season, has resulted in very good yields from manuring. The results, both for this and the preceding year are given below in tabular form. In June Mr. Weir had the misfortune to be laid up with a broken ankle, and through this, his pigs were able to get loose amongst the crop, several plots being completely spoilt.

Basic Slag, 400 lbs. per acre, applied in 1910, on the plots with maize only gave this year over 12 bags per acre, as against $2\frac{1}{2}$ on the unmanured plot, and on the plots with the mixed crop of maize and velvet beans, gave over 11 bags maize as against 3 bags in the unmanured plot, whilst superphosphate, 200 lbs. per acre applied in 1910 and again in 1911 gave this year a little over 9 bags maize.

The experiment is being carried on for a third season, 1912-13, but witchweed has completely overrun the plots which previously carried beans and maize (no beans were sown this season), whilst the other plots are also very badly infested. The bulk of the crop has been cut for ensilage in order to get the land cleared.

RESULTS OF MANURIAL EXPERIMENT ON MAIZE CARRIED OUT BY MR. CHAS. WEIR AT KOEDOESPOORT,
1910-1912, (2 years).

Plot.	Manurial Treatment per Acre.		Yield of Maize per Acre.		Increase due to Manure.		Value of increase, 2 years.		Cost of Manure, 2 years.		Profit or Loss from Manuring.		Plot.
	1910-11.	1911-12.	1910-11.	1911-12.	1910-11.	1911-12.	2 years.	2 years.	2 years.	2 years.	Profit.	Loss.	
1	600 lbs. Slaked Lime	Nil	625	1,062	186	460	lbs. 646	£ s. d. 1 9 1	£ s. d. 1 1 0	£ s. d. 0 8 0			1
2	600 lbs. Slaked Lime & 200 lbs. Superphosphate.	200 lbs. Superphosphate	898	1,993	459	1,391	1,850	4 3 3	2 2 0	2 1 0			2
3	1,000 lbs. Ground Woven Phosphate.	Nil	837	1,872	398	1,270	1,668	3 15 1	1 12 6	2 2 7			3
4	200 lbs. Superphosphate	200 lbs. Superphosphate	813	1,822	374	1,220	1,594	3 11 10	1 1 0	2 10 10			4
5	400 lbs. Basic Slag	Nil	1,106	2,220	667	1,620	2,287	5 2 11	1 0 0	4 2 11			5
6	Nil	Nil	439	602	..	..	..	..	..	..			6
7	(Plots 1 to 5 carried a mixed crop of Maize and Velvet Beans, sown together in the rows, which were 3ft. 6ins. apart.)												7
8	1,000 lbs. Ground Woven Phosphate.	Nil	1,224	2,217	562	1,733	2,295	5 3 5	1 12 6	3 10 11			8
9	Nil	Nil	662	484	..	..	..	..	..	..			9
10	600 lbs. Slaked Lime..	Nil	896	..	234	..	..	..	..	..			10
11	600 lbs. Slaked Lime and 200 lbs. Superphosphate.	200 lbs. Superphosphate	1,214	..	552	..	..	..	..	..			11
12	400 lbs. Basic Slag	Nil	1,497	2,433	835	1,949	2,784	6 5 4	1 0 0	5 5 4			12
13	200 lbs. Superphosphate	200 lbs. Superphosphate	1,199	..	537	..	..	..	..	..			13
14	400 lbs. Bone Meal	Nil	1,612	1,734	950	1,250	2,200	4 19 0	1 8 0	4 11 0			14
15	200 lbs. Superphosphate and 150 lbs. Nitrate of Soda.	200 lbs. Superphosphate 100 lbs. Nitrate of Soda.	1,459	..	797	..	..	..	..	..			15
16	200 lbs. Bone Meal and 100 lbs. Superphosphate.	100 lbs. Superphosphate	1,305	2,016	643	1,532	2,175	4 17 11	1 4 6	3 13 5			16
17	200 lbs. Superphosphate 150 lbs. Nitrate of Soda, and 100 lbs. Sulphate of Potash	200 lbs. Superphosphate 100 lbs. Nitrate of Soda, and 50 lbs. Sulphate of Potash.	1,336	..	674	..	..	..	..	..			17

Plots 7 to 16 carried maize only—rows 3ft. apart.
Plots 9, 10, 12, 14 and 16 were completely spoilt by the pigs in June, 1912, so that no second year's results were obtainable.

I must still plead for the definite suspension of free analyses of soils to farmers. We have reached the point at which, from the point of view of the general public, such work has comparatively little value, and we might reasonably be starting a soil survey or breaking new ground in the matter of soil investigation. To give an instance, we have undertaken a series of soil analyses and investigations on behalf of the Forestry Division, and during February and March we received from them 48 samples of soil and subsoil, and since that a further 15 samples. Work of this kind has often to take second place to less important work of the kind referred to above. Finally, it is to be hoped that before next summer we will have been provided with more suitable buildings than those we at present occupy, as not only does the work suffer great inconvenience through the high temperature and dust, etc., but it is a considerable strain on the workers themselves.

H. J. VIPOND,

Chemist.

APPENDIX XV.

ANNUAL REPORT OF THE EDITOR, AGRICULTURAL JOURNAL.

Division of Publications,
Pretoria,

March 31st, 1913.

THE SECRETARY FOR AGRICULTURE.

I have the honour to submit my Report for the 15 months ended 31st March, 1913.

During the first half of this period the post of Editor was occupied by Mr. F. MacDermott, who was appointed to take charge of the Journal at the time when the Cape, the Transvaal, and the Natal Agricultural Journals were merged into the Union Journal. Mr. MacDermott, who was formerly Editor of the Cape Agricultural Journal, held the position of Editor of the Union Journal for a period of one and a half years when he resigned to engage in farming. In the month of October, 1912, the writer was appointed editor of the Agricultural Journal; and, accordingly, the present Report deals with the latter half of the departmental year now under review.

It had been found that the circulation of the Journal was rapidly falling, and you wisely determined to rescind the previous policy which called for the payment of an annual subscription, and decided to distribute the Journal free of charge to all *bona fide* farmers. The wisdom of this change has been fully justified, and within six months the circulation has more than doubled, indicating not only a widespread interest but, at the same time, adding to the revenue derived from advertisements. The circulation of the Journal immediately prior to the abolition of the subscription rate was: English edition, 19,000; Dutch edition, 2,500. On the 31st March, 1913, the circulation was as follows:—English, 24,500; Dutch, 9,500.

It may be added here that the cost of printing the Journal during the year ended 31st March, 1913, was:—English edition, £5,861 1s. 3d.; Dutch edition, £2,609 3s. 11d. The revenue from advertisements in both editions during the same period was £2,657 15s. 3d. (These particulars have been supplied by the Government Printer).

Before leaving the Journal and passing to other matters I would like to make a few remarks on the improvements which are necessary to bring this periodical up to a high level worthy of a great Department of Agriculture. Amongst the farming community it is commonly said that the new Union Agricultural Journal is not equal to the old Transvaal Journal. Now it cannot be maintained that the articles which are at present inserted in the Union Journal are less illuminating or instructive than those which appeared in the pages of the Transvaal Journal; while the editor ventures to affirm that his capacity has not grown less with the lapse of time since he edited the Transvaal Journal. What then is the reason? In the marketing of fruit it is deemed the height of folly to pack navel oranges in a gunny sack or Burbank plums in a beer-barrel. Even in South Africa choice fruit is carefully wrapped in tissue paper and placed in attractive packages. But in official circles an idea still seems to be prevalent that a Government publication should be badly printed on poor paper. This is a mistake. Cheap work is always bad work. Moreover, if the general public are taxed, directly or indirectly, for the Agricultural Journal it would surely seem a wise and far-sighted policy to give them a periodical of which they might well be proud. At present both the paper and the printing are not of the best, and coloured illustrations—which formed so important and pleasing a feature of the Transvaal Journal—are not admitted on the score of expense. But the cost of colour printing, within the last few years, has been greatly reduced. With such a subject as "Poisonous Plants" it is indeed a poor sort of economy which does not permit the stock-farmer to detect these deadly veld herbs by means of their distinguishing natural tints. Such parsimony is unworthy of a great Department which exists solely to advance the interests of the rural population. Print on good paper, and brighten the Journal by means of helpful colour plates and all reasonable complaints on the part of the farming community will speedily disappear.

During the latter part of October I visited Bloemfontein in connection with the Third Annual Dry-Farming Congress. This meeting which lasted four days attracted representative farmers from all parts of South Africa and proved a highly successful and enthusiastic gathering. It terminated with a most instructive "Agricultural Tour" through the Eastern Free State. Amongst the many notable papers read at the Congress I would mention Mr. J. A. Nesor's Presidential Address on "The Advance of Agriculture," Sir Percy Fitzpatrick's important paper on "Pasture Grasses" and Mr. T. A. Carlson's lecture on "Afforestation" delivered at Ficksburg. A splendid debate on "Closer Settlement" closed a truly memorable Congress.

During the month of December I made a tour of inspection through Natal, paying particular attention to the dairy, wattle, and tea industries. On my return to the Transvaal I took the opportunity of investigating the orange and tobacco industry of Rustenburg. In the month of February I made a tour of the Western Province and looked into the wine, fruit, and ostrich industries. This brings me up to date. Having been granted six months' leave of absence I propose to spend my vacation in the investigation of British farming.

During the latter part of December Mr. H. J. Choles spent some time investigating the sugar industry of Natal, and his instructive articles on this subject which are now appearing in the *Agricultural Journal* have elicited many enquiries and much favourable comment.

I trust that my previous recommendation that Mr. Choles be granted the title of Assistant Editor will meet with your approval. He is an enthusiastic and capable official and is worthy of every encouragement.

The work of translation has been exceptionally heavy during the past year owing to the steady growth of the Department and the increased output of our *Annual Reports* and various other Departmental publications. To Mr. Otto Menzel, and his two Assistants, Mr. D. S. van Warmelo and Mr. J. C. Goldman my best thanks are due for the assiduity with which they have carried out their several duties. I also desire to record my indebtedness to my colleagues in the Department who have so readily placed their material at my disposal, and also to the many farmers who have given me much valuable information during my travels throughout the Union.

Nor must I pass without a word of thanks to the Government Printer and his Staff for their ready help in the publication of the *Journal*.

WM. MACDONALD,

Editor, *Agricultural Journal*.

ANNEXURE A.

STAFF OF THE DIVISION OF PUBLICATIONS AND LIBRARY.

Editorial Staff:

- | | |
|--------------------------|---------------------|
| (1) Editor and Chief ... | Dr. Wm. Macdonald. |
| (2) Assistant | H. J. Choles. |
| (3) Clerk | J. A. M. Wiles. |
| (4) Typist | Miss E. M. Joubert. |

Translating Staff:

- | | |
|-----------------------------|--------------------|
| (5) Chief Translator ... | O. Menzel. |
| (6) Asst. Translator ... | D. S. van Warmelo. |
| (7) Typist | J. W. Pliewisch. |
| (8) Typist | J. Selleschop. |
| Messenger | J. Humphreys. |
| (9) Librarian | P. Ribbink. |
| (10) Clerical Assistant ... | H. W. Gallagher. |
| Messenger | P. Scheepers. |

APPENDIX XVI.

REPORT OF THE LIBRARIAN.

UNION OF SOUTH AFRICA.

Department of Agriculture,
Pretoria, 11th July, 1913.

The Secretary for Agriculture,
Pretoria.

I have the honour to submit to you my report for the period 1st January, 1912, to 31st March, 1913.

The Library is housed in the lower hall of Erasmus's buildings, Church Square, a room 30 x 50 x 16 ft., but is to be removed to the Union Buildings at an early date.

During the year the P.W.D. added shelving accommodation to the extent of about 1,000 ft. The present available accommodation amounts to about 2,422 ft.

During the year 1911, 354 bound volumes were received and during 1912-13 572. The total number of bound books now in the Library is 3,288. In addition to this, some 10,848 books are deposited with the different Division and School Libraries.

The number of Periodicals, bulletins, etc., subscribed for or exchanged was as follows:—

1910.	1911.	1912-13.
1,023	1,067	1,166

Number of Periodicals with Divisions and Schools, 558.

The total number of periodicals, such as bulletins, etc., received in duplicate and distributed, amounted to 840, as compared with 4,017 received during the preceding year. This decrease is due to all publications being sent direct to the various Divisions or Schools, while formerly they were first sent to the Library and registered as duplicates.

During the year 1912 the Library of the Veterinary Experiment Station Onderste Poort was inspected, and a system was introduced by which the Librarian is enabled to control the purchase of books for the various Divisions and Schools and to systematically check the works deposited with these branch-libraries.

A large stock of Departmental Publications sent to Pretoria from Cape Town, and Maritzburg was sorted and arranged on shelves. These publications are now issued free to applicants and several thousands of copies have thus been disposed of.

The following books, etc., were circulated during the periods mentioned:—

	1910-11	Jan. 1912-March 1913.
Books	530	760
Periodicals	2,289	2,870

Thus showing an increase of 230 books and 581 periodicals.

The Visitor's book recorded 1,758 visitors to the Library, no figures are available for preceding years.

The letters received numbered 598 and letters sent out 627. No figures are available for previous years.

The following was the expenditure under items N 1 and 3 of Vote 6:—

N 1. Salaries	£463 13 11
N 3. Incidental Expenses, Purchases of	
Books, etc.	1,724 10 4

In cases where books have been lent to the Public a deposit of 10s. was taken; deposit money now on hand amounts to £8 10s. 6d.

PAUL RIBBINK,
Librarian.

APPENDIX XVII.

CO-OPERATIVE DIVISION.

Pretoria,
17th April, 1913.

The Secretary for Agriculture.

I have the honour to submit the following Report on the work of this Division during the period 1st January, 1912, to 31st March, 1913:—

REGISTRATION.

The Register of Co-operative Agricultural Societies established under Act No. 17 of 1908 (Transvaal) contained, at the 31st December, 1911, the names of twenty-eight Societies. Of these, six were removed from the Register during the period now under review, while two have never engaged in active operations. The number of Societies at present actually carrying on business in the Transvaal Province is, therefore, twenty.

Only two Societies have been established under Act No. 1 of 1910 (Orange Free State) of which one is inactive.

Both of the Acts above referred to require that the names of all members of Co-operative Agricultural Societies shall be noted by the Registrar, and published in the Gazette, together with particulars of changes in the membership as they occur from time to time.

The following is a complete list of Societies in the two Provinces, showing, for purposes of comparison, the membership at the 31st December, 1911, and at the 31st March, 1913, respectively. It should be noted that whereas the total of 9,948 at the former date includes members of both active and inactive Societies, the members of Societies not engaged in business have been omitted in arriving at the total of 11,558 at 31st March, 1913. The actual increase in membership, therefore, is larger than would at first sight appear.

COMPLETE LIST OF REGISTERED SOCIETIES WITH PARTICULARS
OF MEMBERSHIP.

IN ACTIVE OPERATION.
(*Transvaal.*)

Name of Society.	Number of Registered Members.	
	At 31.12.11.	At 31.3.13.
Bethal Landbouw Co-operatieve Vereeniging ..	516	526
Centraal-Westelijke Co-operatieve Landbouw Vereeniging	537	463
Ermelo Co-operatieve Vereeniging	109	93
Heidelberg Co-operatieve Landbouw Vereeniging	190	194
Hoogeveld-Eendracht Boeren Co-operatieve Vereeniging	422	500
Koster Co-operatieve Landbouw Vereeniging ..	514	696
Krugersdorp en District Landbouwers Co-opera- tieve Vereeniging	273	209
De Lichtenburg Co-operatieve Landbouw Maat- schappij	643	1,115
Lydenburg Co-operatieve Landbouw Vereeniging	170	185
De Magaliesberg Co-operatieve Tabaksplanters Vereeniging	982	1,872
Marico Boeren Co-operatieve Vereeniging ..	209	291
Middelburg Landbouwers Co-operatieve Vereeni- ging	513	723
Olifantsrivier Co-operatieve Dorschwerk ..	182	191
Potchefstroom Co-operatieve Landbouw Vereeni- ging	1,582	1,615
Pretoria Boeren Co-operatieve Vereeniging ..	697	677
Rustenburg Boeren Co-operatieve Vereeniging..	305	652
Standerton Co-operatieve Boeren Vereeniging ..	470	394
Waterberg Landbouwers Co-operatieve Vereeniging	304	333
Wolmaransstad Co-operatieve Landbouw Vereeni- ging	180	220
Zoutpansberg Co-operatieve Landbouw Vereeniging	423	394
<i>(Orange Free State.)</i>		
Vrede Co-operatieve Landbouw Vereeniging ..	20	215
NOT CARRYING ON BUSINESS.		
<i>(Transvaal.)</i>		
Bloemhof Co-operatieve Landbouw Vereeniging..	29	..
De Oostelike Transvaalse Co-operatieve Zuivel Vereeniging	146	..
<i>(Orange Free State.)</i>		
Kopjes Co-operatieve Landbouw Genootschap..	15	..
Membership at 31.12.11 of Societies since re- moved from Register	9,431	..
	517	..
	9,948	11,558

REMOVAL OF SOCIETIES FROM REGISTER.

During the year the following have been removed from the Register of Co-operative Agricultural Societies (Transvaal):

1. *Belfast Ko-operatieve Vereeniging.*

Dissolved by Order of the Supreme Court of South Africa (Transvaal Provincial Division) on the application of the Directors. The circumstances under which this action was decided upon are dealt with in my Report for the year 1911.

2. *Carolina Ko-operatieve Vereeniging.*

Dissolved by Resolution of Members. (See my Report for 1911 as to the cause of dissolution.)

3. *Low Country Co-operative Agricultural Society.*

Dissolved by Resolution of Members. This Society did not at any time carry on extensive operations, and its winding up involved no loss to members.

4. *Rustenburg Vruchtenkwekers Co-operatieve Vereeniging.*

The present Rustenburg Boeren Ko-operatieve Vereeniging is the result of an amalgamation of this Society with the Rustenburg Ko-operatieve Landbouwers Vereeniging. The membership having fallen below seven, this Society automatically ceased to exist.

5. *Rustenburg Ko-operatieve Landbouwers Vereeniging.*

In the circumstances above mentioned, this Society also ceased to exist by reason of the membership falling below seven.

6. *Lydenburg Co-operatieve Veeboeren Vereeniging*

My report for the year 1911 sets forth the cause of dissolution of this Society, which was effected by Order of the Supreme Court of South Africa (Transvaal Provincial Division) on the 13th February, 1913, on the application of the Directors.

PROGRESS MADE BY INDIVIDUAL SOCIETIES.

With few exceptions the period of fifteen months covered by this Report has resulted in a very material improvement in the financial condition of existing Societies, and in the amount of business transacted.

The principal aim of a Society is, of course, to obtain for its members the highest possible price for their produce, and the mere fact that a particular Society has accumulated a certain reserve is not conclusive evidence of its complete success. It conveys, however, an indication of good and careful administration of the Society's affairs, and of loyal support by members. The accumulated funds also afford valuable protection against the effects of any future losses the Society may sustain; they reduce the heavy cost of borrowed capital; and offer attractive inducements to farmers who have not yet become members.

I have much pleasure in submitting the following rough statement of the present position of each Society, including a Summary of Transactions during the twelve months ended 31st December, 1912. It should be mentioned that the Summaries have been compiled from information furnished by officials of the particular Society concerned, and that the figures quoted in respect of the Turn-over are in some cases merely approximate.

BETHAL LANDBOUW CO-OPERATIEVE VEREENIGING.

A comparison of the following statement with the figures contained in previous Reports of this Division will show that the amount of business transacted by the above-mentioned Society has considerably increased during the past two years; and so far as can be seen, the present rate of progress is likely to be maintained.

[U.G. 47- '13.]

After setting aside approximately £1,000 for depreciation and other contingencies, the nett profit for the financial year ended 30th June, 1912, amounted to £354 4s.; Members' Funds appearing at the appreciable figure of £1,425 10s. 1d., as compared with £814 2s. 1d., at the end of the previous year.

Summary of Transactions for the twelve months ended 31st December, 1912.

<i>Produce:</i>					
Mealies sold	...	...	...	...	114,200 bags
Value of other produce sold	...	...	...	...	£2,562 3s. 10d.
<i>Farming Requisites:</i>					
Value of Machinery, etc., sold to members	...	...	...	...	£19,952 6s. 6d.

CENTRAAL-WESTELIJKE CO-OPERATIEVE LANDBOUW VEREENIGING.

Excellent progress continues to be made by this Society. In the Balance Sheet for the financial year ended 31st May, 1911, Members Funds appear at £1,047 2s. 11d., representing more than £2 per member, and I understand that in view of this fact the Society is considering the question of increasing the Entrance Fee from £1 to £2. Members of this Society would appear to have every reason to be satisfied with the position of affairs.

Summary of Transactions for the twelve months ended 31st December, 1912.

<i>Produce:</i>					
Mealies sold	...	...	...	...	114,850 bags
Value of other produce sold	...	...	...	...	£2,175 0s. 0d.
<i>Farming Requisites:</i>					
Value of Machinery, etc., sold to members	...	...	...	...	£15,224 16s. 7d.

ERMELO CO-OPERATIEVE VEREENIGING.

Although this Society has a smaller membership than any other similar organisation, its operations have been attended with marked success, and the position disclosed in the Balance Sheet for the year ended 31st December, 1912, must be gratifying to the 104 members who comprise the Society.

After deduction of substantial amounts for depreciation, etc., the profit for that year amounted to £546 12s. 2d., with which addition the Reserve Fund now amounts to £1,680, or £16 per member.

The Society has a particularly energetic Board of Directors, to whom much credit is due for the splendid progress effected.

I can give no explanation of the curious fact that whereas the membership of other Societies is increasing, the Ermelo Society, notwithstanding its sound financial position, and the inducements it is able to offer, has suffered a reduction of sixteen members since the 31st December, 1911.

Summary of Transactions for the twelve months ended 31st December, 1912.

<i>Produce:</i>					
Mealies sold	...	...	...	...	21,738 bags
Value of other produce sold	...	...	...	...	£1,700
<i>Farming Requisites:</i>					
Value of Machinery, etc., sold to members	...	...	...	...	£6,228

HEIDELBERG CO-OPERATIEVE LANDBOUW VEREENIGING.

The result of the working for the financial year ended 30th June, 1912, was a nett profit of £187 11s. 7d., increasing the balance to credit of Profit and Loss Account to £348 12s. 3d.

From the date of its establishment this Society has made steady progress, and there is every likelihood of a continuance of the success which has hitherto attended its operations.

*Summary of Transactions for the twelve months ended 31st December, 1912.**Produce:*

Mealies sold	...	...	...	...	44,234 bags
Value of other produce sold	£3,558 14s. 0d.

Farming Requisites:

Value of Machinery, etc., sold to members	...	£3,556 9s. 5d.
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HOOGVELD EENDRACHT BOEREN CO-OPERATIEVE VEREENIGING.

Conducted on sound business-like lines, this Society is making very rapid strides. During the financial year ended 30th June, 1912, actual working operations resulted in a nett profit of over £1,000, which figure has been debited with £713 for depreciation, and £250 for bad and doubtful debts.

The total balance to the credit of Profit and Loss Account at the date referred to was £981 17s. 10d., and the Society has a further Reserve of £338, being Entrance Fees paid by members.

To this excellent position may no doubt be attributed the steady increase which is taking place in the membership.

From investigations made by my Inspectors, it would appear that the operations for the current year are proving equally satisfactory, and that a further addition to Capital Funds at the end of the year may confidently be anticipated.

*Summary of Transactions for the twelve months ended 31st December, 1912.**Produce:*

Mealies sold	...	...	...	...	89,000 bags
Value of other produce sold	£3,900

Farming Requisites:

Value of Machinery, etc., sold to members	...	£11,400
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KOSTER CO-OPERATIEVE LANDBOUW VEREENIGING.

This Society was originally called the "Rustenburg Koster Co-operative Landbouw Vereeniging," and is referred to in my previous Report under that title.

I have pleasure in reporting that the Balance Sheet for the financial year ended 30th June, 1912, shows a further strengthening of the Society's financial position. After making a substantial allowance for depreciation, the nett profit for that period amounted to £212 16s. 5d., and the Reserve Fund (including that sum) to £595 3s. 11d.

*Summary of Transactions for the twelve months ended 31st December, 1912.**Produce:*

Mealies sold	...	...	...	...	15,594 bags
Value of other produce sold	£3,247 5s. 1d.

Farming Requisites:

Value of Machinery, etc., sold to members	...	£10,728 16s. 9d.
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KRUGERSDORP EN DISTRIKT LANDBOUWERS CO-OPERATIEVE VEREENIGING.

Although a distinct improvement is noticeable in business methods, this Society is not doing well. During the fifteen months the membership has been reduced by sixty-four, and the Society is being very poorly supported by the remaining members. Up to the present a total loss of £1,750 has been sustained, which, in the event of dissolution, would be reduced by £450, being the value of Members' Funds. I am of opinion that this Society should be wound up.

*Summary of Transactions for the twelve months ended 31st December, 1912.**Produce:*

Mealies sold	...	...	...	...	12,415 bags
Value of other produce sold	£2,720 13s. 6d.

Farming Requisites:

Value of Machinery, etc., sold to members	...	£700 12s. 6d.
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[U.G. 47—'13.]

DE LICHTENBURG CO-OPERATIEVE LANDBOUW MAATSCHAPPIJ.

In the previous Report of this Division reference was made to the necessity of effecting a re-organisation of the Lichtenburg Society, with a view to adjusting the somewhat unsatisfactory state of affairs brought to light as the result of investigations made by my Inspectors. The value of that re-organisation is reflected by the large increase in the membership, and a corresponding increase in the volume of business transacted. The additional revenue thus accruing to the Society has enabled it to recover previous losses, and to establish itself on a sound financial footing.

In the absence of exceptional circumstances, the result of the current year's operations is likely to be very satisfactory.

At the 31st May, 1912, the financial position was as follows:—

The nett profit for the year amounted to £239 3s., leaving a balance to credit of Profit and Loss Account of £208 0s. 7d. Entrance Fees totalled £681, so that at the date referred to the Reserve Fund was £889.

*Summary of Transactions for the twelve months ended 31st December, 1912.**Produce:*

Mealies sold	...	...	...	...	...	182,345 bags
Value of other produce sold	£8,111 5s. 0d.

Farming Requisites:

Value of Machinery, etc., sold to members	...	£14,815
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LYDENBURG KO-OPERATIEVE LANDBOUW VEREENIGING.

Complete success continues to attend the operations of this Society. The financial statements for the half year ended 31st December, 1912, show a nett profit for that period of £747 11s., which amount, together with previous profits, Entrance Fees, etc., represents a total Reserve of £2,012 9s. 10d.; approximately £11 per member.

The Society has a particularly capable and energetic Manager, to whose efforts are largely due the excellent results attained.

The following Summary discloses a substantial increase in the turnover:—

*Summary of Transactions for the twelve months ended 31st December, 1912.**Produce:*

Mealies sold	...	...	...	...	...	19,987 bags
Value of other produce sold	£6,622 5s. 0d.

Farming Requisites:

Value of Machinery, etc., sold to members	...	£2,365 9s. 7d.
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DE MAGALIESBERG CO-OPERATIEVE TABAKSPLANTERS VEREENIGING.

No less than 2,496,635 lbs. of Tobacco were delivered by members of this Society for disposal during the year ended 31st December, 1912, and practically the whole was sold at remunerative prices. This enormous turnover has enabled the Society to rapidly establish itself on a sound financial footing. It has already accumulated a Reserve Fund of some £8,000.

Taking into consideration the fact that the Society has not yet completed its second year of active operation, it shows remarkable development, and reflects the greatest credit upon the Board of Directors, and also upon the Manager-Secretary, under whose control the practical work of the Society has been well conducted.

MIDDELBURG LANDBOUWERS CO-OPERATIEVE VEREENIGING.

This Society, although it has not quite maintained the rate of progress made during the previous year, is doing very well. The profit for the financial year ended 30th June, 1912, amounted to £49, and this, together with previous profits, Entrance Fees, etc., represents a total Reserve Fund of £1,080. The membership and turnover are steadily increasing.

Summary of Transactions for the twelve months ended 31st December, 1912.

<i>Produce :</i>					
Mealies sold	...	...	..	...	99,890 bags
Value of other produce sold	...	...	...	...	£2,000

<i>Farming Requisites :</i>					
Value of Machinery, etc., sold to members	...	...	...	...	£13,800

OLIFANTSRIVIER CO-OPERATIEVE DORSCHWERK.

The Balance Sheet for the financial year ended 31st December, 1912, is very satisfactory. The year's operations resulted in a profit of £211 17s. 7d., which brings the total Reserve to £1,150.

POTCHEFSTROOM CO-OPERATIEVE LANDBOUW VEREENIGING.

During the last six months of the period under review, much attention was required to be given to this important Society, the failure of which, in view of its large membership and enormous turnover, would entail serious consequences.

A detailed investigation conducted by one of my Inspectors brought to light the fact that the staff had recently been unable to adequately cope with the large amount of business transacted, and that consequently the books and affairs of the Society had been allowed to fall into some disorder, resulting in irregularities the effect of which, I fear, will be to greatly weaken the Society's financial position. The position was immediately communicated to the Board of Directors at a meeting of the Board, which I personally attended, and at which the Directors agreed to appoint an experienced Accountant, and to adopt certain other recommendations I had to offer in regard to business methods.

The Society is numerically very strong—1,615.

Summary of Transactions for the twelve months ended 31st December, 1912.

<i>Produce :</i>					
Mealies sold	...	...	...	...	94,836 bags
Value of other produce sold	...	...	...	...	£37,652 3s. 4d.

<i>Farming Requisites :</i>					
Machinery, etc., sold to members	...	...	...	...	£24,589 7s. 2d.

PRETORIA BOEREN KO-OPERATIEVE VEREENIGING.

The Balance Sheet for the financial year ended 28th February, 1913, shows a loss of £7,399 3s. 9d. Encumbered with this burden of debt, the progress towards recovery of the Society will, I fear, be very slow.

It will be observed that the figures contained in the following summary total only one-half of the previous year's turnover. This evidence of lack of confidence of the members in the Society will no doubt slowly be removed as the result of the present more satisfactory control exercised by the management over the business.

Summary of Transactions for the twelve months ended 31st December, 1912.

<i>Produce :</i>					
Mealies sold	...	...	...	...	22,809 bags
Value of other produce sold	...	...	...	...	£10,561 6s. 7d.

<i>Farming Requisites :</i>					
Value of Machinery, etc., sold to members	...	...	...	...	£4,936 6s. 7d.

RUSTENBURG BOEREN KO-OPERATIEVE VEREENIGING.

At the 31st December, 1912, the profits of this Society amounted to £276 7s. 2d., a result which, in view of the short period of the Society's existence, is distinctly encouraging, and as the membership is rapidly increasing, further improvement may be expected to attend its future operations.

Summary of Transactions for the twelve months ended 31st December, 1912.

<i>Produce:</i>					
Mealies sold	...	...	...	...	3,000 bags.
Value of other produce sold	...	...	...	...	£4,480

<i>Farming Requisites:</i>					
Value of Machinery, etc., sold to members	...	...	...	...	£9,534

STANDERTON KO-OPERATIEVE BOEREN VEREENIGING.

The Auditor's Report and relative statements for the year ended 31st March, 1912, are discouraging.

Owing to members' deliveries of maize falling considerably below expectations, and to large quantities being rejected on account of dampness and bad condition, the Society was obliged to cancel certain contracts against payment, and to dispose of the rejected maize at considerable loss.

During the year ended 31st March, 1913, the Society again suffered severely as the result of drought, but the results show a considerable improvement on the previous year, and I have no doubt that the Society will overcome its difficulties during the course of a year or two.

Summary of Transactions for the twelve months ended 31st December, 1912.

<i>Produce:</i>					
Mealies sold	...	...	...	...	25,777 bags
Value of other produce sold	...	...	...	...	£1,020

<i>Farming Requisites:</i>					
Machinery, etc., sold to members	...	...	...	...	£11,500

WATERBERG LANDBOUWERS KO-OPERATIEVE VEREENIGING.

The agricultural development of the Waterberg District has been seriously retarded during the past two years by drought, and the prevalence of disease amongst stock, and consequently a reduction has taken place in the amount of business transacted by the Society. Many of the members from whom in ordinary circumstances large supplies might have been expected, had practically no produce to dispose of, while others were unable to deliver to the Society by reason of transport difficulties occasioned by prohibitions imposed by regulations affecting diseases of stock. Notwithstanding these handicaps, the Society has continued to carry on without incurring losses, and it may therefore be anticipated that under normal conditions it will make good progress.

The Reserve Fund amounts to £372 3s. 7d.

Summary of Transactions for the twelve months ended 31st December, 1912.

<i>Produce:</i>					
Mealies sold	...	...	...	...	2,766 bags
Value of other produce sold	...	...	...	...	£489 4s. 5d.

<i>Farming Requisites:</i>					
Machinery, etc., sold to members	...	...	...	...	£3,233 18s. 5d.

WOLMARANSSTAD KO-OPERATIEVE LANDBOUW VEREENIGING.

I have to report a very encouraging state of affairs as compared with the year 1911. A comparison of the figures contained in the Statement below with those of the preceding twelve months discloses a large increase in the turnover. The membership is steadily increasing, and the Society is able to show a small profit on the year's transactions. I have every reason to believe that this distinct improvement will be maintained.

Summary of Transactions for the twelve months ended 31st December, 1912.

<i>Produce:</i>					
Mealies sold	...	...	...	...	13,714 bags
Value of other produce sold	...	...	...	...	£3,927 19s. 7d.

<i>Farming Requisites:</i>					
Value of Machinery, etc., sold to members	...	...	...	...	£8,480 7s. 1d.

ZOUTPANSBERG CO-OPERATIEVE LANDBOUW VEREENIGING.

Of the 394 members who comprise this Society, only half have had any dealings with the Society during the past two years. The Directors and Manager have been doing their best to keep the Society going, and the Balance Sheet for the year ended 30th June, 1912, shows a slight improvement in the financial position. It is evident, however, that the gradual decrease in the turnover can only result in further losses, and I am of opinion that the Society should be dissolved.

Summary of Transactions for the twelve months ended 31st December, 1912.

<i>Produce:</i>					
Mealies sold	...	...	...	...	1,386 bags
Value of other produce sold	...	...	...	...	£1,900
<i>Farming Requisites:</i>					
Value of machinery, etc., sold to members	...	...	...	...	£1,775

VREDE KO-OPERATIEVE LANDBOUW VEREENIGING (O.F.S.).

The Vrede Society has not yet completed its first year, and I am unable to state at present whether or not it is likely to prove a success.

TOTAL TURNOVER OF CO-OPERATIVE AGRICULTURAL SOCIETIES.

The total turnover of Societies during the calendar year 1912 was considerably in excess of the business transacted in 1911, as will be seen from the following approximate statement:—

	1911.	1912.
<i>Produce:</i>		
Mealies sold	... 759,000 bags	879,000 bags
Tobacco sold	... 1,246,076 lbs.	2,496,635 lbs.
Value of other produce sold	£108,000	£104,000
<i>Farming Requisites:</i>		
Value of Machinery, etc., sold to members	... £142,000	£167,000

CENTRAL AGENCY FOR CO-OPERATIVE SOCIETIES, LIMITED.

It will be remembered that when, at the end of 1908, steps were taken by farmers to carry into practical effect the principles of Co-operation as embodied in the Transvaal Co-operative Act, the late Transvaal Government undertook to establish, and maintain for a period of one year, an Agency in Johannesburg to represent Societies as a whole, and to serve as a medium for the joint sale of produce.

It was obvious that the mere formation of bodies of farmers in various districts for co-operative purposes would be of little effect unless some scheme were devised for the application of the principles of Co-operation not only to individuals, but also to the Societies themselves, and accordingly in 1909 the "Central Agency for Co-operative Societies" came into being, with offices situate in Commissioner Street, Johannesburg.

At the 31st May, 1910, the Societies relieved the Government of further responsibility for that institution, and formed a private company with limited liability: the present "Central Agency for Co-operative Societies, Limited."

On the 16th February, 1912, Mr. B. Stilling-Andersen vacated the post of Director of Co-operation in order to undertake the management of the Company. On the expiration of some six months' service in that capacity, Mr. Andersen resigned the managership and returned to Europe, since when a permanent successor has not been appointed.

Upon the success or failure of this Agency must necessarily depend, in considerable degree, the future of the whole movement, and I have therefore deemed it my duty to devote particular attention to its affairs, and to endeavour to place at the disposal of the Board of Directors as much of my time as could possibly be spared for that purpose. I have adopted the practice of attending

all meetings of the Directors, and have satisfaction in feeling that my presence is welcomed by the gentlemen who comprise the Board.

Societies invite the fullest inquiry into their affairs, and as shareholders in the Company they will, I am sure, have no objection to the publication of the fact that until recently the commission earned has not been sufficient to cover expenses. I am pleased to say, however, that in the absence of exceptional circumstances, the deficit will have been fully recovered at the end of June next.

AGRICULTURAL CO-OPERATION IN THE ORANGE FREE STATE.

It will be observed that there is only one active Society in the Orange Free State. I have attended several meetings of farmers held in various parts of that Province with a view to the formation of new Societies, but have not felt certain that the proposed organisation would prove a success in the absence of close supervision by this Division. Hampered by lack of assistance, I am quite unable to devote attention to additional Societies, and in the circumstances I have had to temporarily discourage the extension of the movement in the Orange Free State.

EXTENSION OF CO-OPERATIVE MOVEMENT TO OTHER PROVINCES.

Many inquiries have been received from farmers resident in the Natal and Cape Provinces as to the possibility of establishing in those Provinces Co-operative Agricultural Societies of a similar nature to those of the Transvaal.

Such a course would naturally involve the application of suitable legislation to the whole of the Union, and in anticipation of the eventual extension of the movement, I have submitted for consideration a draft Bill on lines somewhat similar to the present Transvaal and Orange Free State Acts, but embodying such modifications and alterations as have been shown by practical experience to be desirable.

I understand, however, that pressure of other legislative matters renders it improbable that a Bill will be submitted to Parliament during the present Session.

CO-OPERATIVE SOCIETIES FOR THE SALE OF TOBACCO.

The happy results which have followed the establishment of the Magaliesberg Co-operative Tabaksplanters Vereeniging have drawn the attention of tobacco growers to the advantages of Agricultural Co-operation as applied to the sale of Tobacco, and it may reasonably be anticipated that a number of similar organisations will be established in the near future.

Meetings were recently held in the Piet Retief District with a view to forming a Tobacco Society, but on due consideration it was rightly decided that for the present the better course would be to create a branch of the main Society.

The time is not far distant, however, when separate organisations in the Piet Retief and other districts will become a necessity, and in the meantime action should be taken in the direction of securing qualified men to take control of the new Societies. It is extremely doubtful whether suitable men could be obtained in South Africa to-day, and I therefore venture to throw out the suggestion that facilities be afforded by the Government to a limited number of young men to attend a course of instruction at Rustenburg in the sorting, grading and treatment of Tobacco, and in the general administration of a Co-operative Tobacco Society on the lines so satisfactorily followed by the Magaliesberg Tabaksplanters Co-operative Vereeniging.

LAND BANK LOANS.

At the 31st March, 1913, the total amount of authorised loans to Co-operative Societies from Land Bank Funds was £288,300, which had been drawn upon by Societies to the extent of £211,900.

Since the date of my last Report an Act has been passed establishing a Land and Agricultural Bank for the Union of South Africa. The provisions of that Act in regard to loans to Co-operative Societies differ materially in many respects from those of the Land and Agricultural Bank Further Amendment Act (No. 17 of 1909, Transvaal).

The following are the more important alterations:—

1. A Society may, subject to any other provision contained in its Rules, obtain an advance when authorised by two-thirds of such members as are present at a special meeting called for that purpose.

The authority of two-thirds of the total number of members of the Society is required under the Co-operative Acts.

2. The Land Bank may not guarantee a contract entered into by a Society unless it has first satisfied itself that the Society is in a position to supply, and that all accounts, documents, papers and books of the Society are in order.

This has been interpreted by the Land Bank as requiring an inspection by an officer of the Bank. Contracts are frequently entered into by the Central Agency on behalf of from fifteen to twenty Societies which do not admit of such delay in submission of a guarantee as must necessarily be involved by an inspection of each individual Society, and as a consequence Societies were obliged, during the year 1912, to obtain this facility elsewhere.

3. Guarantees are now charged for at the rate of 1-8th per cent.: no charge was previously levied.
4. The Registrar of Co-operative Agricultural Societies is not required to certify that applications for loans are in order.

Much discussion has recently arisen as to the correct construction to be placed upon that provision of the Land Bank Act which enables the Bank to inspect the books of Societies for the purpose of ascertaining whether any funds it has advanced have been carefully and economically expended, and to call up loans improperly applied.

Armed with this authority, the Bank has sometimes brought pressure to bear upon Societies to effect changes in matters of a purely domestic nature, with the laudable object of protecting the interests of members, and encouraging the progress of the movement on lines advocated by the Bank.

The question of credit sales may be quoted as a case in point. The Bank is strongly opposed to the practice of selling goods on credit, and it is, I firmly believe, a source of considerable danger. The Societies, too, are beginning to realise this, and general improvement has recently been noticeably in respect of the amount of outstandings, and of the security obtained. The Bank, however, conceived the idea of bringing the practice to an abrupt termination by notifying Societies that credit sales must be immediately discontinued, and that failure to do so would result in the calling up of loan funds.

Now the sale of goods on credit is clearly a quite legitimate transaction, and cannot of itself be deemed to constitute an improper expenditure of funds, inasmuch as such transactions are contemplated and provided for in the Regulations of the Societies. A storm of protest was consequently raised by the Societies which, however, gradually subsided in the absence of definite action by the Bank.

I am in entire sympathy with the views of the Bank on this question of credit, but it seems to me that the only practical solution of the difficulty is to encourage Societies to effect a gradual reduction in the number of such transactions, to obtain more adequate security, and to exercise more careful supervision over the accounts. That course has always been followed by this Division in respect of any Society found to have given excessive credit, and with excellent results.

The general attitude taken up by Societies in regard to all points of this nature is that the Societies require of the Land Bank nothing more than such ordinary banking facilities as are obtainable from any other bank; that their private affairs are entrusted by the members to a Board of Directors whose duty it is to control the general conduct of business, and to see that the capital of the Society is properly expended; that should a Society sustain losses, such losses would have to be borne by the members, and would not affect the Land Bank; that it is therefore unreasonable that the Bank, while accepting no responsibility for the results of its actions, should be entitled to exercise authority over the

actions of the Directors; that the powers intended to be conferred by the Legislature upon the Land Bank are limited to the right to call up a loan in the event of a clear case of use of loan funds in a manner not authorised by the Regulations of the particular Society concerned; and that more intimate concern in administrative matters exposes the Government to the possible reproach of having taken the affairs of a body of private persons out of their hands, and occasioned them losses.

GENERAL.

Hard experience has taught Societies that it pays them better to appoint thoroughly competent and experienced managers and secretaries, and to be liberal in the matter of salary, than to fill such positions with poorly paid and inefficient men. A distinct improvement is noticeable in the class of man now employed in these capacities.

Frequent complaints were at one time lodged against Societies to the effect that they engaged in business of a nature not contemplated in the Co-operative Acts. There would not appear to be any ground for complaint at the present date. Isolated cases may possibly occur from time to time of the irregular sale of such articles as sugar, tea, coffee, etc., by the smaller Societies, but I am satisfied that such unnecessary and highly undesirable practices are not carried on to any appreciable extent.

STAFF.

I wish to express my appreciation of the excellent manner in which I have been assisted by the various members of the staff of this Division. I trust that when suitable opportunity offers, the claims to promotion of the officers under my control will receive consideration, as I feel that in some cases the salaries paid are inadequate. A statement of the staff of my Division is attached, showing the salary paid to each member thereof.

C. H. KEET,

Chief Inspector and Registrar of

Co-operative Agricultural Societies.

List of Staff and Salaries, Division of Co-operation, as at 1st April, 1913:—

Name.	Rank.	Salary.	Allowance.
		per annum.	
Keet, C. H.	Chief Inspector ..	£710	..
Retief, J.	Inspector	650	..
Minnaar H.	Asst. Inspector ..	280	£57
Marks, A. E.	1st Grade Clerk ..	420	..
Muller, J. F.	3rd Grade Clerk ..	225	..
Lodge, Miss I.	Typiste	225	..
Keet, T. W.	Boy Clerk	70	..

APPENDIX XVIII.

ANNUAL REPORT OF THE REGISTRAR OF BRANDS
AND CONTROLLER OF FENCING.Pretoria,
30th April, 1913.

The Secretary for Agriculture.

I have the honour to submit the following report on the work of the Division of Brands and Fencing for the 15 months ending March 31st, 1913.

BRANDS BRANCH.

The work of this Branch, although not quite so heavy as in the preceding year, has been sufficiently so to keep the staff engaged therein more than fully employed. As will be seen from the comparative statement given hereunder, the number of registrations have decreased to a considerable extent, but this may be ascribed to (a) the abandonment at the beginning of the year of compulsory branding, and (b) to the fact that registrations in what may be described as the compulsory districts were exceptionally heavy during the previous four years.

	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912-13.	
Total	209	476	488	1,043	3,283	4,139	4,686	2,491	1,330	18,145
<hr/>										
No. of Brands transferred during the period 1/1/12 to 31/3/13	33
No. of Brands cancelled	27
No. of branding irons ordered	3,080
No. of branding irons despatched	3,056
No. of books of certificates of sale issued	62
Amount collected for Registration Fees and branding irons	£1,404 11s. 3d.

In addition to the Transvaal Brands, 424 and 57 respectively were registered for the Cape and Orange Free State Provinces, and from the innumerable inquiries received from all parts of the Union, I have no doubt that if the Transvaal three-piece system is extended to the other Provinces, the desirability of which I cannot sufficiently emphasise, the number of registrations will increase enormously.

On the 1st of January, 1912, the Minister decided that compulsory branding in following districts, should be discontinued, and the Supervisors were with the exception of six who were needed for service in the Transkeian Territories, notified that their services would not be required after the 31st idem:—Zoutpansberg, Barberton, Waterberg, Lydenburg, Middelburg, Marico, Carolina, Rustenburg, Piet Retief, Pretoria, Ermelo (along the Swaziland Border), and Wakerstroom (Low Veld portion). We were fortunately able to re-employ a number of these men as Sheep Inspectors and the hardships usually attendant upon retrenchment were thereby minimised.

On the 1st of May, 1912, it was considered advisable to complete the compulsory branding of native-owned cattle in the Zoutpansberg district, and five Supervisors, all drawn from those previously discharged, were appointed for the purpose and placed in charge of branding areas defined in consultation with the Magistrate, to whom I am indebted for help and advice. In addition to their ordinary duties these officers are constantly engaged in supervising the regular dipping of native-owned cattle and have instructions to render whatever assistance they may be able to, notably in regard to the detection and prevention of illicit movements of stock from infected areas.

In pursuance of the Minister's decision, six Supervisors were sent to the Transkeian Territories on the 19th of January, 1912, to brand all native-owned cattle within a four mile zone on the Cape—Transkei border and, after meetings had been held by the various Magistrates, whereat the necessity and object of branding were fully explained to the natives, operations were immediately commenced and proceeded without interruption until completed towards the end of March; the Supervisors being retrenched on their return to the Transvaal.

BRANDS DIRECTORY.

The 8th edition of the Annual Brands Directory has been compiled and published in accordance with the requirements of section 11 of the Great Stock Brands Ordinance of 1904 and the 9th edition, which was compiled in the first quarter of the current year, has been submitted to the Government printer for publication.

The first column of the following tabular statement shows the number of cattle branded and rebranded by Supervisors in each District during the month of January, 1912, and in respect of the Zoutpansberg district only for the period 1st to 31st January, 1912, and May 1st, 1912, to March 31st, 1913. The second column gives the total number of cattle branded to date under the compulsory regulations.

Schedule "B."

Pretoria	...	...	...	...	642	60,341
Carolina	...	...	...	...	35	11,658
Ermelo	...	...	...	...	—	662
Piet Retief	...	...	...	...	63	22,236
Middelburg	...	...	...	...	303	49,616
Marico	...	...	...	...	80	34,113
Barberton	...	...	...	...	54	20,485
Rustenburg	...	...	...	...	712	95,856
Wakkerstroom	...	...	...	...	—	6,794
Waterberg	...	...	...	...	213	116,980
Lydenburg	...	...	...	...	—	39,261
Zoutpansberg	...	...	...	...	20,664	192,164
					22,766	650,166
Transkeian Territories	...	...	...	...	—	39,251
						689,417

AGRICULTURAL SHOWS.

During the period under review, exhibits were sent to the Rosebank and Middelburg (Cape) Shows only, but, in view of the probability of the Brands Act being extended, it is proposed to have the Division represented at all the more important shows in the Cape, Orange Free State and Natal Provinces during the forthcoming show season, to exhibit charts showing the pattern of characters, sample branding irons, ear marking appliances and to explain the undoubted advantages of the three-piece system of brands and the procedure to be followed in regard to registration and acquiral of brands.

VOLUNTARY FENCING.

Acts No. 12/08 Transvaal and 20/10 Natal.

The above Acts, under which Government supplied material up to the value of loans approved by the Land Bank in the case of the former and by the Minister in the case of the latter, were repealed on the 1st October, 1912, by Act No. 17 of 1912, which provides for the granting of cash loans, wherewith to purchase the necessary material, by the Land Bank direct.

The following summary shows the value of material issued on loan and for cash, respectively, number of farms affected, bonds prepared and registered, inspections, and issues from the various depots:—

SUMMARY OF WORK DONE IN CONNECTION WITH THE ABOVE FROM 1ST JANUARY, 1912, TO DATE OF REPEAL OF ACTS.

	Material issued. Value.	No. of Farms to which supplied.	Bonds prepared and registered.	Farms inspected.
Loan Act 12/08, Transvaal	£50,217 4 3	345	495	737
Loan Act 20/10, Natal ..	20,267 12 8	273	273	685
Cash Sales	13,752 0 4	419	—	—
Total	£84,236 17 3	1,037	768	1,422

Total No. of issues from 1/1/12 to 30/10/12—2,235.

The disposal of surplus fencing material on hand as at the 30th of September, 1912 valued at approximately £30,000 was entrusted to the Deputy Accounting Officer of the Department.

COMPULSORY FENCING.

Acts 38/04 Transvaal and 6/07 Natal.

Operations under the above Acts, which were repealed by Act No. 17 of 1912, on the 1st of October last, again show a most gratifying decrease, and one is almost led to hope that with the extended adoption of dipping, coupled with the exceptionally easy terms on which farmers throughout the Union can now obtain fencing loans, the compulsory enclosing of private farms by Government on account of animal disease will soon be a thing of the past.

Under the provisions of the new Act the Minister may call upon the owner of any holding, if it be within an area infected or suspected of being infected with stock diseases, to erect fences along the whole or any part of the boundaries thereof. The specifications of the fence are determined by the Department, and if the owner fails to erect the fence within the time stipulated, the Minister may cause it to be erected by the Department. The 50 per cent. rebate hitherto allowed and paid by the Government has been discontinued and the total expenditure incurred by the Department in connection with the erection of such fences will in future be recovered, in equal yearly instalments, from the owners whose properties are divided by the fences.

The following tabular statement shows the number of farms fenced, existing fences repaired, material issued and expenditure during the period under review:

TRANSVAAL.

Act 38/04:—

Farms fenced (new outbreaks)	7
Fences repaired	30
Fence erected at Government expense	1
	<hr/>
	38
	<hr/>

Value of material issued in connection with fences erected and repaired, 50 per cent. recoverable ...	£1,254	1	10
Irrecoverable expenditure in connection with erection of gates at Naboomspruit—Waterberg district ...	30	19	8

Cash Disbursements:—

Transport 50 per cent. recoverable	£333	10	2
Erection 50 per cent. recoverable	381	14	7
Surveys	15	16	0
	<hr/>		
Total	£2,016	2	3

Recoverable from owners of fenced and adjoining farms, 50 per cent.	£984	13	3½
50 per cent. paid by Government	984	13	3½
Irrecoverable expenditure	46	15	8
	<hr/>		
Total	£2,016	2	3

Total cost incurred and paid by Government	£1,031	8	11½
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Act 17 of 1912:—

Fences ordered by Minister and erected by owners—			
Lydenburg district	2		
Fences ordered by Minister and being erected departmentally. (Particulars of expenditure not yet available)—			
Piet Retief	1		
Zoutpansberg	1		
Fences erected by Government: Expenditure irrecoverable—			
Pretoria North	2		
Total expenditure	£126	18	3

The following statement shows the number of Bonds prepared and registered accounts made up, schedules prepared, Bonds cancelled and substituted, queries in respect of Bonds replied to, Deeds, tracings and diagrams obtained:—

Farm accounts made up	...	...	...	...	223
Schedules prepared	...	...	...	...	1,987
Bonds registered	...	...	...	...	1,987
Bonds cancelled and substituted	...	...	...	...	436
Queries in respect of Bonds replied to	...	...	...	...	292
Deeds particulars obtained in connection with new fencing, repairs to existing fences, cancellations and substitutions of Bonds	...	...	...	...	3,905
Searches at Deeds Office in connection with cancellation of Bonds	...	...	...	...	85
Tracings and Diagrams prepared	...	...	...	...	394

NATAL.

Act 6/07:—

New Fencing	...	...	...	...	4 farms.
Fences completed, inspected and accounts prepared and registered	...	...	...	...	48 farms.
Expenditure incurred, recoverable from owners of fenced and adjoining farms	...	...	...	...	£567 3 2

CAPE PROVINCE.

During the period under review the Zuurberg Fence, which I referred to at length in my previous report was completed. The total expenditure incurred, inclusive of the estimated value of labour and transport supplied by European farmers owning property along the line of fence, amounted to £11,079 12s. 10d., plus £44 2s. for surveys; made up as follows:—

	£	s.	d.
Material supplied	5,708	14	11
Value of labour and transport supplied by farmers	5,164	14	0
Cash paid in respect of erecting fences along Crown Lands	206	3	11
Surveys	44	2	0
	£11,123	14	10

Recoveries:—

	£	s.	d.
Labour and transport supplied by farmers	5,164	14	0
Government's share of cost of fencing Crown Lands Boundaries	206	3	11
To be recovered from natives	5,370	17	11
Balance to be paid by Government	337	17	0
Surveys to be paid by Government	44	2	0
	£11,123	14	10

The exact amount to be recovered from natives has not yet been definitely fixed, but the above may be taken as approximately correct.

The following expenditure was incurred during the year in respect of repairs to the East Coast Fever fences in the Transkeian Territories:—

	£	s.	d.
Repairs	82	9	4
Contractors Stutterheim fence, Balance due	149	15	11
	£232	5	3

Act 17/12.

Fences ordered by the Minister and being erected by the Department. Accounts of expenditure not yet available:—

Mlaklakas Location, King William's Town	...	...	...	1
Paardekraal Location, East London	...	...	...	1

CORRESPONDENCE.

I append particulars of correspondence, etc., dealt with during the period under review by the correspondence branch of this Division:—

Letters, outward	...	...	...	...	...	19,199
Letters, inward	...	...	...	...	...	16,342
Telegrams despatched	...	...	...	...	...	744
Estimates prepared	...	...	...	...	...	492
Memoranda of Agreements prepared	...	...	...	...	...	331
Applications sent to Land Bank	...	...	...	...	...	331
Provisional Bonds prepared, Act 12/08	...	...	...	...	...	349
Final Bonds prepared	...	...	...	...	...	146
Supplementary Bonds prepared	...	...	...	...	...	391
Applications, Act 20/10, Natal	...	...	...	...	...	369
Bonds completed, Act 20/10, Natal	...	...	...	...	...	270
Accounts rendered, Act 6/07, Natal	...	...	...	...	...	19
Notices to debtors, Act 6/07, Natal	...	...	...	...	...	379
Statements	...	...	...	...	...	90
Applications under Act 17/12; checked, certified or returned for further particulars	...	...	...	...	...	204
Total	...	...	...	...	...	39,656

STAFF.

On the 1st January, 1912, the staff comprised 57 individuals, which during February and March was increased to 61: by the 1st April, 1913, the staff had been reduced to 13, and when the work in connection with the winding up of affairs under the old Acts is completed, it will be reduced to 5.

The reductions are to be attributed to (a) transfer of fencing work to the Land Bank and (b) abandonment of compulsory branding.

W. J. NUSSEY,

Registrar of Brands and Controller of Fencing.

APPENDIX XIX.

 DRY-LAND AGRONOMIST.

To the Secretary for Agriculture,

Lichtenburg, 15th April, 1913.

I have the honour to submit the following report for the 15 months ended March 31st, 1913. I have dealt with the work of the Division of Dry-Farming under seven "sections" viz:—

1. Our Endeavour and Future Policy.
2. Travel, Investigations and Lectures.
3. Field Demonstrations.
4. Agricultural Shows (Judging and Exhibiting).
5. The Dry-Farming Congress.
6. Co-operative Experiments.
7. The Dry-Land Experiment Stations.

OUR ENDEAVOUR AND FUTURE POLICY.

Ever since we have started the Dry-Land Experiment Stations in 1909, our object has been (*a*) To encourage farmers to arrest the water running or falling on their farms in all possible ways, viz:—In dams, reservoirs, etc., and also in the *soil*, where irrigation is impracticable or impossible. (*b*) To prove that under certain climatic conditions, with some depth of soil, and proper tillage sufficient moisture may also be "banked-up" in the soil itself to grow and mature crops upon, during periods of drought. (*c*) To try and make a certain class of man take more interest in his best friend—the soil—and to encourage the better methods of cultivating the same. (*d*) To find out which cereals and plants will grow best and most profitably in the dry-land zone of South Africa. (*e*) To try and find out more truths about dry-farming, by pushing the practical side of the work and by conducting our operations as far as time and opportunity permit, on a scientific basis. (*f*) To keep in touch with the experiment stations of other countries and (*g*) To experiment on a small scale and exercise a rigid economical procedure, in order to encourage even the poorest farmer to apply the system on his farm.

TRAVEL, INVESTIGATIONS AND LECTURES.

There were many and constant calls from Farmers' Associations throughout the Union and although it was not possible for me to comply with even half the requests, I nevertheless did my best to attend a number of those farmers' meetings from which repeated applications were received and most of which were waiting for my services since 1911. During the period under review I have lectured at the following places:—Vrede (O.F.S.), Duivels Kloof (Low Country Northern Transvaal) and at 5 more centres in the Low Country and district of Pietersburg, Queens Town, Grahams Town, Harvestvale, Alexandria, Alicedale, Sandflats, Graaff-Reinet, Middelburg (Cape Province) and four places in the Middelburg district, Naauwpoort, De Aar, Beaufort West, Victoria West, Paarl (district), Prieska, Vryburg, Burghersdorp, Aliwal North, Steynsburg, Halseton, Sterkstroom, Bloemfontein, Allendale, Winburg, Cradock, Standerton, Volksrust, Ficksburg, Heidelberg (district), Potchefstroom (district), Lichtenburg (district), I have been struck with the vast amount of excellent soil, even within the more populous centres of the Union, land not being used for any purpose and practically lying waste under a rainfall of, from 10 to 22 inches and more. I am furthermore convinced that our great National Object, *i.e.*, to get a larger white population on the land can never be fully attained, until the great importance of Dry-Farming is fully realised by every South African farmer. It has been said that we had a good many failures. The same may be said of every experiment that was ever conducted by man. I am, however, glad to be able to state here emphatically that none of our crops have ever failed through drought. Our partial failures were due to hail storms, summer frosts, plant lice, poverty stricken soil, etc. No thinking man will ever

deny the vast importance and great value of irrigation with regard to the development of this country; neither will any sane person discourage the construction of irrigation works of every description, but irrigation works are costly and confined; dry-farming is cheap and within the reach of, or near enough, every South African farmer, and it is plainly the duty of every farmer and of the Department to utilise the vast areas of waste, rich land for planting useful crops, grasses or trees in order to support more human beings and animals and to try and work up new industries, and with the fact in view, that it is possible to conserve enough moisture in the soil of most of these waste-lying areas to grow and mature crops upon, we endeavour to respond to the many calls for lectures and investigations throughout the Union.

FIELD DEMONSTRATIONS.

It was always clear to me that too many of our farmers do not attach half enough value to the proper preparation of their seed beds and to the proper use and adjustment of their agricultural implements. I have, therefore, on the invitations of Farmers' Associations, given a number of field demonstrations with the object of showing the proper methods of ploughing and pulverising the soil for dry-farming purposes and also to show how to establish a proper soil mulch (ground blanket), etc. These demonstrations seem to have done a great deal of good, judging from the increased crop yields, according to letters received from many farmers who have adopted the better methods of soil preparation. I have not had the time yet to visit half of the places from where invitations for field demonstrations were received.

AGRICULTURAL SHOWS (JUDGING AND EXHIBITING.)

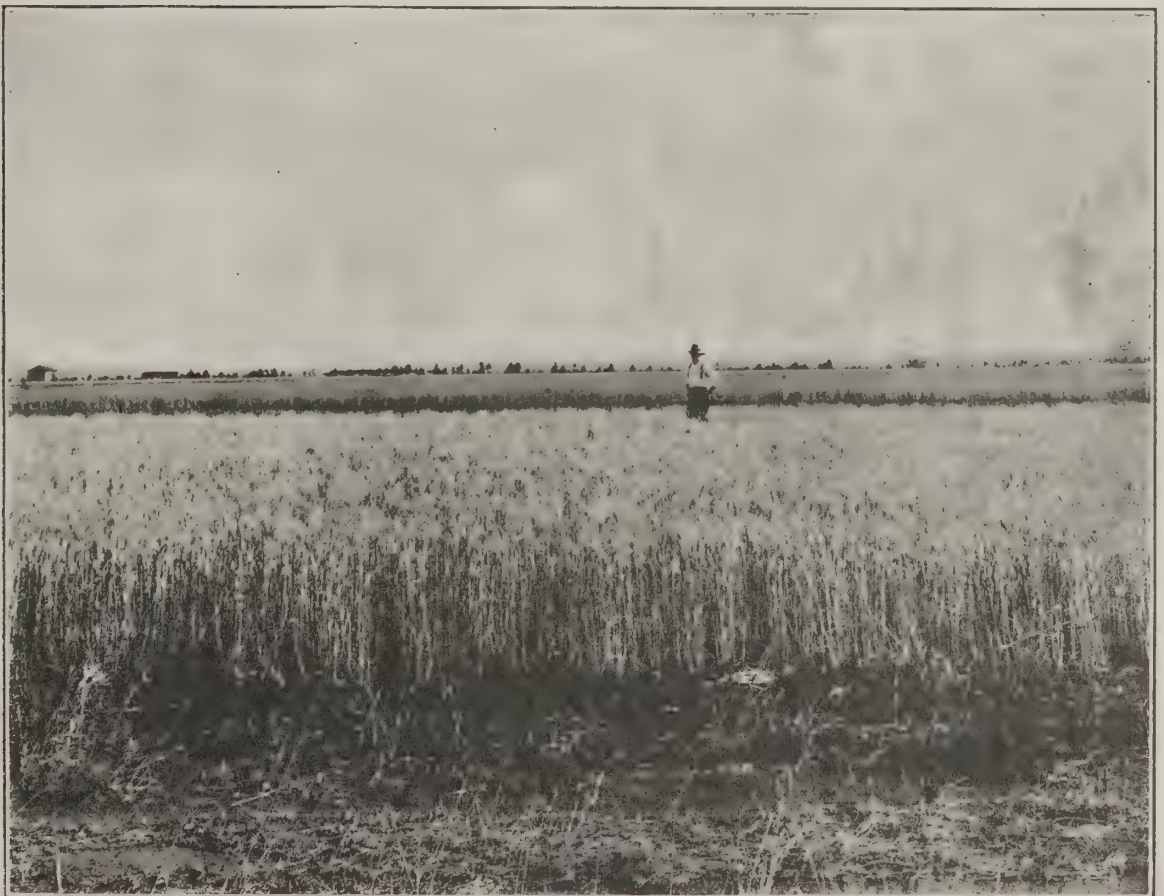
We are every year asked by different Show Committees to judge and lecture at their respective Agricultural Shows. This is generally a good opportunity to inspect the different crop-grades and also the various varieties produced in different parts of the Union; to hear the "weals and woes" of the different dry-land farmers and to compare their crops, the yields, the cost and profits with those of the other districts and Provinces within the Union; to discuss possibilities of growing more, better and refined varieties, etc. We have from time to time exhibited crops produced on the Lichtenburg Dry-Land Station, and I am glad to state that the other dry-land stations are now beginning to fall into line. The station at Warm Baths has already produced good crops, this year, and the other stations are not behind and it is hoped that all the stations will be able to stage a good exhibit next "Show Season." We sincerely trust that the work done by our different stations and the results obtained by our numerous followers will help to prove that the aim of the Department of Agriculture was, and always will be, the development of the country and the welfare of the farmer.

THE DRY-FARMING CONGRESS.

The Union Dry-Farming Congress is now firmly established. The first congress was held at Klerksdorp, in 1910, under the presidency of Mr. J. A. Nesor, M.L.A., who is also Vice-President of the International Dry-Farming Congress. The general and International Secretary is Dr. William Macdonald, Editor of the Agricultural Journal, whose resistless energy has greatly helped to make the congress a success. The congress was, with the consummation of Union, reorganised in order to embrace all dry-land farmers throughout South Africa. In October, 1911, the first Union Dry-Farming Congress was held at Pretoria. The second Congress was held at Bloemfontein in October, 1912, and the third annual Congress will be held at Johannesburg in October, or November, 1913. The Executive Committee of the Congress consists of members representing every part of the Union. The annual Congress was, thus far, a great success and it seems to gain more popularity every year under the leadership of its able and popular president (Mr. J. A. Nesor). Delegates have travelled not only from all parts of the Union, but also from Rhodesia, German and Portuguese territories to take part in our deliberations. The Congress certainly affords a convenient meeting place at which dry-land farmers can congregate to discuss general problems concerning the South African dry-farming community. The Household Science Congress is a section of the Union Dry-Farming Congress, the president of which is Mrs. Louis Botha and the general secretary is Miss J. C. van Duijn, Lecturer in Household Science, who has rendered most valuable services to the women's section. The



LICHTENBURG DRY LAND STATION.
 I.—POLISH WHEAT. II.—CHERNOUSKA WHEAT.
 Grown during 1912.



LICHTENBURG DRY LAND STATION
 KUBANKA AND CHERNOUSKA ACRE PLOTS—JUST RIPE. GROWN 1912.

following paragraphs extracted from a letter received from the Executive Secretary of the International Dry-Farming Congress, Mr. John T. Burns, of Tulsa, U.S.A., will perhaps give an idea of what is being done by our brother dry-land farmers in the United States of America and Canada. "The Oklahoma Board of Control" is now organised and at work. On January the 21st the City of Tulsa will vote "bonds for the erection of a \$125,000 (£26,000) auditorium seating 8,000 people, "for the purpose of housing our Dry-Farming Congress. Architects are at work on "sketches and estimates for Exposition buildings aggregating 150,000 sq. feet of "space not including Executive Offices, a special Oklahoma building and possibly "Government building for the United States and Canada."

A letter received from the Honourable C. S. Chan, Minister of Agriculture and Forestry of China, says "I wish to assure you that hereafter we shall look forward "to an even closer and more co-operation between your dry-farming organisation "and China in the development of this great agricultural propaganda."

CO-OPERATIVE EXPERIMENTS.

The Department of Agriculture has since November, 1912, inaugurated co-operative experiments, on the £ for £ system, with town councils. The town of a district being the natural centre where farmers congregate for business, shows, "Nachtmaal" and other purposes, it was thought that no better place could be selected for co-operative experiments than the town lands. I am of opinion that the co-operative system will work well in such places where town councils and farmers associations have sufficient funds to add to the Government grant-in-aid; that those communities, councils or associations which are not strong enough to finance their stations liberally for at least five consecutive years, will find it very difficult, if not impossible, to keep such stations in proper working order, because the maximum Government grant is £300 *i.e.* the Government give a £ for a £, up to £300, and supposing that the public can only raise, say £50, then the grant-in-aid will be £50 and this money will be clearly insufficient for even a very small station. I have furthermore found that it will be absolutely necessary to place a responsible foreman in charge of every co-operative station because it will never do to hire a different person every week or so to go and plough or harrow. I am at least, responsible to account for the Government money, spent on such stations and to see that the money granted is spent economically. A good foreman devoting all his time and energy to such a station will not work for less than £10 to £15 per month. I therefore venture to suggest that instead of the Government granting £300, only agree to pay the foreman's salary of such stations for five years. The public to give the ground, fencing material, implements, drought animals, etc. Such a station will then, at the very utmost, cost the Government £180 per year instead of £300 and it will be far easier for the councils or associations, to get implements, fencing material, drought animals, etc., from their commercial and farming communities than will be the case with hard cash. The Government to retain the right to withhold the grant altogether, if the public do not fulfil their part of the contract.

CO-OPERATIVE EXPERIMENT STATIONS have been established at Prieska, Graaff-Reinet and De Aar. The town councils of Bloemfontein and Harrismith have applied for such stations.

Prieska. Acreage surveyed, fenced and ploughed 10 acres.

Acreage planted 2½ acres.

Graaff-Reinet. Acreage surveyed and granted 100 morgen.

A "Dry-Land Station Committee" has been formed to receive public contributions and to look after the clerical and administrative part of the work. The town council (same as at Prieska) has granted £50 per year for five years. The town council are awaiting the sanction of the Administrator with regard to the ground, after which work will be started at once.

De Aar. Acreage granted 10 morgen.

The "Dry-Land Station Committee" is busy to collect funds to commence with the work of their station.

DRY-LAND EXPERIMENT STATIONS.

Lichtenburg. The acreage ploughed during the period mentioned was 400 acres of which 204 acres were placed under legumes, trees or crops; the remaining 196 acres being virgin soil broken up or moisture fallows left.

Scale of work. I was repeatedly instructed *not* to conduct experiments on a large scale, because we are not to give the impression that the Government is competing with farmers on the market. Besides the word *experiment* is sufficient to explain what we are after. No one except *all* experiments to succeed and in order not to risk time and money, it is necessary to conduct experiments on a small scale until such time as the experiment has been thoroughly tested. Then even, the idea is that the farmer, and not the Government, must grow such tested varieties on a large scale. On the other hand again, there is always such an enormous demand for seed of certain varieties, that one often feels tempted to grow such varieties on a large scale in order to supply seed to a larger number of farmers, who may then supply their neighbours. Again many farmers have already told me that they were much against the experiment stations producing crops in bulk, and competing with them on the market.

Maize. This variety we have to grow on a larger scale in order to have sufficient feed for animals during winter and periods of drought.

Time of Ploughing for Wheat. It is quite evident that a greater percentage of moisture is contained in seed-beds prepared early in the rainy season than is the case with the same kind of soil prepared later in the season.

We have also found that a land ploughed once-deep and then properly harrowed, with the necessary "soil-mulch" established from time to time and the weeds kept down, contains a higher percentage of moisture at seeding time, than an adjoining field, same kind of soil, which has been ploughed more than once at intervals of, say, two or three months. It is obvious that ploughing the same field deep more than once before seeding, disturbs the moisture bed, bringing the dry soil mulch under and the moist ploughed stratum on top. This continual deep stirring and turning up of the moist soil seems to encourage evaporation. The capillary movement from subsoil to ploughed stratum is, naturally also disturbed by the plough. This will, of course, be more noticeable in those parts where the rainfall is low. Land of a sandy or blowy nature is generally treated with a light harrow in order to retrain the right tilth and not to allow it to turn into a soil-powder and blow. Of course, some soils are so sandy or powdery, that only effective windbreaks or the incorporation of much kraal manure will stop them from blowing.

Time of Ploughing for Maize. Farmers in the Western Transvaal generally plant "Hickory King" up to 15th or 25th December, after which date they consider that there is a risk of the crop getting frosted in the Autumn. Preparing the Maize lands for the following season, from the date when planting operations have terminated, has proved when next planting season comes round, and brings no rain with it, that there is sufficient moisture conserved in the ground to carry the crop, at least, into the months when rain is pretty certain to come. Such maize lands are prepared by us in the same manner as those for wheat, barley or oats; only some of such maize seed-beds being prepared late in the rainy season cannot "catch up" the same amount of moisture as lands prepared earlier and must later on get help from rain. I am confident, that if maize farmers prepare for a drought every year by preparing (ploughing and harrowing) their maize lands as early as possible, that they will soon find out the benefits of this procedure. I am pleased to state that many farmers have already successfully adopted this method. Some farmers plough their maize land well and early enough, but *do not harrow*. This is (in my opinion) a great mistake. Even two good harrowings between ploughing and planting season will do wonders. To my mind those farmers living in such parts of the Union where only winter rains fall, ought to be able to conserve enough moisture in the ground, to grow and mature a maize crop upon. Such lands, of course, will have to be prepared at the very start of the rainy season.

Moisture-saving fallows are always very safe things to fall back upon during periods of prolonged drought, we have, however (for an experiment) reaped two acres of wheat in November, 1911, and have ploughed and prepared the same land (a brownish clay patch in the beginning of December, 1911, and oats in the beginning of April, 1912, with the result shown in attached schedule 20. This experiment is being repeated, on a small scale, to find out for certain how far farmers may risk on a large scale, under similar climatic conditions.

Harrowing of growing crops. Questions on this subject are continually pouring into this office. I have, therefore, written a circular letter on this item, a copy of which is attached to this report. We only harrow some of our wheat crops (sometimes) when we find an ugly crust with cracks appearing on the surface of the soil after rains. Last year we had not sufficient rain during the growing period of (the greater part) our crops to form a crust, consequently only two acres of oats and four acres of wheat were harrowed once, when the crops were stooling.

Time of planting. This is a matter entirely subject to climatic conditions. The month of May is perhaps the best time for wheat sowing in this part of the country, but we have never yet had one normal year, since this station was started. Summer or late frosts and terrible hailstorms may be counted among our regular visitors. It was, therefore, clear that we must sow different seeds of the same variety in succeeding months, in order not to have all crops in the flowering or ripening stage at the same time. By adopting this system a portion of our crops have, each year, escaped total destruction. The months September to November (1909-1911) were generally accompanied by dry hot weather and hot westerly winds, with occasional thunder or hail storms and also sudden variation of temperature with frost over night.

Manures. We have not used manures or fertilisers on this station, excepting on the plots mentioned in the attached statement and a little kraal manure (3 trolley loads, about 4 tons to the acre) on our potato plots.

Labour. When this station was started I was instructed to employ *only white labour*. This is our most expensive item. White boys are paid £2 to £4 per month, according to age and capability. Adults get 4s. per working day. These people have to find food, quarters, etc., themselves. The number of labourers (from the start of this station) has varied from four to 12, according to the amount of work at different times of the year. The object of employing white labour is to educate and interest a number of the unemployed whites (both English and Dutch) in the farming industry. Quite a number of such people so trained have found employment as foremen or managers on farms and are no longer unemployed poor whites. The demand from progressive farm owners for men trained in the proper cultivation of the soil, is great and we cannot supply half of the demand as the number of labourers employed by us, is very limited. Of course, we never recommend a man unless he has proved himself capable, hardworking, honest and sober. The lazy class of poor white never seeks employment on this farm, because our working hours are from dawn to dusk and strict discipline is exercised.

Students. Forty-five applications from students were received since 1910, but not having quarters for such young men on the station we could not take them.—The employees live in town some $2\frac{1}{2}$ miles from the station.

Rainfall. From 1st January to 31st December, 1912 was as follows:

January	...	...	...	2.70	July	...	...	...	0.10
February	...	...	...	5.77	August	...	...	...	Nil.
March	...	...	...	4.39	September	...	...	...	Nil.
April	...	...	...	3.45	October	...	...	...	0.31
May	...	...	...	0.90	November	...	...	...	0.10
June	...	...	...	Nil.	December	...	...	...	4.46

Total precipitation for the 12 months 22.16 inches.

" " " 3 " *i.e.*,
1st January to 31st of March, 1913 9.37 "

A great deal of the precipitation registered above, fell in the form of *hail*.

N.B. Rainfall during *growing periods* of wheat crops was 0.41 inches. Frost was registered on the following dates: *September, 1912*, from 1st to 17th every night, also on 21st, 23rd, 24th, 26th, 29th and 30th. *October, 1912*, 1st, 2nd, 4th, 5th, 6th, 7th, 8th, 11th, 12th, 13th and 14th. *November, 1912*, 10th, 11th, 20th, 26th, 27th and 28th. *December, 1912*, (light frost) 22nd, 23rd, and 27th.

Other meteorological observations (Hygrometer, etc.) subjoined.

Maize. Varieties of maize tried since the commencement of the station are those mentioned on attached tabulated statement.

Wheat (soft) 15 varieties of soft wheats were tried since 1910, of which "Federation," "Kufoid," "Minnesota" and "Red and White Wolkoren," have so far, given the best results.

Wheat (durums) nine varieties of durums were tried of which "Beloturka" "Kubanka," "Chernouska," "Zwartbaard," (South African) and "Apulia," gave the best results. I shall be glad if we could import some pure seed of different

durum and soft wheat varieties, from dry countries like parts of Arabia and Russia, in which countries certain varieties thrive well in the semi-arid regions. Also lucerne, oats, etc., from those arid parts may prove of great value to the drier regions of South Africa.

Yields. The yields of the different varieties of crops, experimented with so far, was certainly not very high, but when it is remembered that we have since the commencement of our operations not had one year without its untimely frosts or destructive hail storms; that our soil is poor and shallow, and that the farm is also swarming with other vermin, such as white and "bulldog" ants, hares, mice, etc., then the yields are not so bad. Our crops have from time to time suffered from many calamities but they have never yet suffered from drought and I make bold to say that we have, at least, proved beyond doubt, that enough moisture can be conserved in the soil to grow and mature crops upon, under these and similar climatic conditions.

Method of Seeding. All the crops were drilled excepting green manure crops and teff grass. The discs of our seed drill are six inches apart. (I mention this because some people seem to think that we place the rows of wheat or oats so far apart that intertillage is possible).

Green manure. Judging by experiments, the ploughing-under of legumes does much good, but in my opinion these are not sufficient to maintain or increase, to a very high degree, the fertility or the amount of humus in very sandy soils, especially if such lands are placed under crops every year. Legumes are certainly splendid rotation crops.

Economy. We are exercising a rigid economy in every possible manner, by repairing our farm implements, wagons, carts ourselves, and we have also erected such buildings as office, seed stores, blacksmith shop, fences, etc., by farm labour. Yokeskeys, shoeing of mules, preparing of reins, etc., is done by farm hands.

Pietersburg Dry-Land Experiment Station. Some time ago the Pietersburg Town Council offered the Government a portion of the farm "Weltevreden," comprising about 1,000 acres, for the purpose of dry-land experiment station, together with a contribution of £100 per annum towards the upkeep of the station. This generous offer was accepted and the laying out of a series of experiment plots commenced. About 25 acres have been prepared of which a portion is now under summer crops; the remainder will be placed under winter crops. The ground is admirably suited for dry-land experiments, being situated only $2\frac{1}{2}$ miles from the town of Pietersburg, whilst the soil is characteristic of a large portion of the northern and western sections of the district. Six miles of fencing, dividing the farm into three paddocks, have been completed. Five thousand eucalyptus trees have been planted for wind breaks and the old kraals have been repaired, the old orchards renovated and 600 yards of road made.

Warm Baths Dry-Land Experiment Station. This station was established in response to repeated calls for advice upon the growing of dry-land crops by the farmers on the "Springbok Flats." A portion of the Government farm, "Noodshulp," lying about four miles from the Warm Baths railway station and adjoining the Horticultural station, was selected. One hundred and sixty acres were fenced for the laying out of a series of experimental plots, 130 acres cleared of native bush and 90 acres of summer crops and legumes are now growing on the lands. About 40 acres of land will be placed under winter crops this year. Besides fencing the above-mentioned 160 acres, 5,800 yards of fence have also been erected to form a camp for the station animals. Four thousand eucalyptus trees have been planted as wind breaks.

The soil of the farm is typical of a large area of ground in the Northern Transvaal and our experiments cannot fail to be of great practical importance to farmers in that region and also to the Government who owns over 3,000,000 acres in the district. The foreman in charge is Mr. G. Trollope, who has worked most assiduously during the short time he has been in charge.

Groenkloof Dry-Land Experiment Station. Work on this station was commenced some nine months ago on a portion of the Government Farm "Groenkloof," adjoining the town lands at Pretoria. One hundred and sixty acres have been fenced, 30 acres ploughed and prepared, of which 10 acres were placed under summer crops and about 15 acres will, this year, be placed under wheat, oats, etc. Three thousand eucalyptus trees (windbreaks, have been planted and 2,000 yards of road made. This station was established in the middle of the financial year, consequently no money was voted for it and the expenditure incurred was defrayed out of savings on the Lichtenburg vote and out of grants voted for other sub-stations. Draught animals, implements, etc., were also supplied by the older stations. The

implements transferred, were more or less old, so that the equipment of this station is not very good, but I am thankful that a small grant was made this year for Groenkloof station.

General. I am pleased to state that there is a growing interest in dry-farming throughout the Union and that our leading farmers are beginning to realise the great dry-farming possibilities of this country. It is encouraging to see, from many letters, addressed to this office, that numerous farmers in different parts of the Union and also in Rhodesia, British East Africa, Belgium Congo and German Africa have adopted our methods and have successfully dry-farmed.

The work and correspondence of this Division have increased to such an extent that it is plainly impossible for me to cope with same single handed and I trust the Department will allow me a small staff, capable of assisting me with a portion of the work as this will give me a better chance to expand the experimental work connected with the more important practical problems of immediate concern to Agriculturists and also to do more research work and find out more truths about dry-farming.

The Soil; Lichtenburg Station, on which our experiments are being conducted is, the greater part, a sandy loam, extremely poor in natural fertility, varying in depth from 6 to some 40 inches, and with a subsoil of ironstone gravel. In some places a layer of rock has been encountered quite near the surface. "Why have you selected the worst piece of land for an experiment dry-land station?" is the question continually being asked by farmers and others visiting the station. Our answer to this question always is: "Because we want to put our experiments through a severe test and we also want to find out the real value of good tillage, fallows and legumes and later on also conduct different manurial tests."

Publications. The following publications were issued during the period under review, viz:—

A book entitled "Droge-Land Boerdery."

Pamphlets

"The Harrowing of Growing Crops."

"The Conservation of Soil Moisture."

The above were all written by myself.

In conclusion I beg to offer my sincere thanks to the many officers of the Department of Agriculture for the courteous manner in which they have assisted me. I also wish to sincerely thank those farmers and others who have so kindly assisted me in the past with the conducting of co-operative experiments on their farms and erven.

HEINRICH S. DU TOIT,

Government Dry-Land Agronomist.

HARROWING OF GROWING DRY-FARMING CROPS, VIZ:— WHEAT, OATS, BARLEY, RYE.

Now, while I realize that I cannot cover every known condition under which growing crops of wheat, oats, etc., may be or have been harrowed, I shall nevertheless endeavour to express my humble opinion, based on experience obtained in this and other countries, in such a manner that the average thinking farmer may know under what conditions wheat and other small grain may be benefited by harrowing.

Assuming that our land was prepared on the Dry-Farming System which means that we have ploughed 9 to 12 inches deep, that we have a well-pulverised, "mellow," friable soil and that we have established the ever-essential *soil mulch* ("ground blanket") on the surface.

Next let us suppose that we get rain on our seed beds *after* we have planted our seed and before such seeds are properly "up," then in case of a soil-crust having formed on the surface we must destroy it and re-establish our "ground blanket" for many reasons.

[U.G. 47—'13.]

Such soil-crusts are either thin and fragile or thick and firm according to the nature of the soil, and the amount of rain fallen thereon. A thin soil-crust can be destroyed by a light spike-tooth or a zig-zag harrow; for a thick "stubborn" crust a heavy or a weighted harrow is required.

It is, however, hardly possible that such a heavy soil-crust can be formed on any soil when the seed and root beds were prepared properly.

Should a soil-crust make its appearance just after the crop is "up," then the farmer must use a weeder or a light zig-zag or steel-tooth harrow to destroy crust. After the roots of the braird are somewhat established a heavier tooth-harrow may be used according to the firmness of the crust. In doing this we may destroy some of the plants, but we will never miss these at harvest time if the condition of our seed and root bed is what it ought to be.

The best results are however always obtained from harrowing after the grain begins to stool or "sucker." Some farmers believe that it is not necessary to harrow a growing crop after the foliage of the plants have practically covered and shaded the surface of the land and thereby, to a certain extent, breaking the direct flare of the sun's rays.

However, if it is found absolutely necessary to harrow a crop after stooling, I would certainly not use anything but a weeder, because it is light and has long pliable teeth also two handles at the back enabling the operator to lift it somewhat where the grain is high and no longer so flexible as the younger crops are.

The ordinary soil-crust (after rains) is generally formed by the rapid evaporation of the moisture at the surface; thereby bringing about the rising to the surface of the moisture in the soil below. In its upward movement it brings the salts of the soil in soluble form, such as alkali, magnesia, etc. As the vapour leaves the surface these chemicals are left in dry form between the particles of the surface or top soil forming a *crust*. When this condition is reached, there are two agencies militating against the crops; *loss of water* and *lack of air* (caused by this crust).

Some soils, when worked become so fine that a sort of "fatty soil powder" blows and settles over the surface of the ploughed land, forming an air-tight layer which interferes with the growth and stooling of the grain. Such a "dust layer" must be stirred up from time to time with a light harrow to admit the air to the roots of the growing crops.

When the surface soil is loose and mulchy it is not necessary to harrow a growing crop, also, if we have not the soil and moisture conditions which really is our foundation, then we cannot always expect favourable results from harrowing. Each farmer, therefore, should with great care, study the necessary physical conditions of his soil and keep in mind the vital importance of the proper percentage of both *air and moisture* in his soil. And with these points well understood he will know exactly *when and how* to use the harrow.

HEINRICH S. DU TOIT,

Government Dry-Land Agronomist.

Station.	No. of Draught Animals.	Other Livestock.	Average No. of Labourers employed.	Total No. of Acres cultivated.	Total No. of Acres followed.	Total No. of Acres cropped with Ex- perimental Crops.	Total No. of Acres sown with Green Manuring Crops.	Total No. of Acres sown with Feeding Crops for Draught Animals.	No. of Trees (shade of Fruit) planted.	Approx. cost of Trees and of Planting	No. of Plots laid out for Experiments.
LICHTENBURG	53 oxen 7 mules 2 horses	Nil	10 white and 2 native	400	196	116	48	40	3,000	£13 10 0	4 Plots (400 acres).
WARM BATHS	12 oxen 2 mules	Nil	5 natives	130	40	70	...	20	4,000	£19 0 0	1 Plot (130 acres).
PIETERSBURG	15 oxen 1 mule	Nil	8 natives	25	21	...	...	4	5,000	£23 15 0	1 Plot (25 acres).
GROENKLOOF	14 oxen 2 mules	Nil	3 natives	30	20	...	...	10	3,000	£13 10 0	1 Plot (30 acres).

HEINRICH S. DU TOIT,
(Government Dryland Agronomist.

GOVERNMENT DRY-LAND EXPERIMENT STATION,--LICHTENBURG.

STATEMENT OF EXPERIMENTS ON CROPS HARVESTED IN 1912 TO 31ST MARCH, 1913.

Variety.	Rate of Seeding (per Eng. acre).	Time of Seeding.	Number of acres planted.	Time of Harvesting.	Average Yield (per Eng. acre).	Remarks.
(1) Soya Beans (Sakura) ...	40 lbs.	28th Dec., 1911	5	End of April, 1912	209½ lbs.	Badly damaged by hail on 20.2.12.
Soya Beans (Sakura) ...	40 lbs.	15th Jan., 1912	5	During last week in May 1912	815 lbs.	This crop was on another portion of the farm and escaped the hail partly. No manure or fertil- izer was used.
(2) Potatoes:-- Northern Star ... (Harvested March, 1913.)	900 lbs.	9th, 10th, 13th, 14th Nov., 1911	4	May, 1912	6,000 lbs.	This crop was several times badly damaged by hail. A previous year the same variety yielded 9,750 lbs. to the acre. Two trolley loads of Kraal manure (per acre) incorporated.
Potatoes:-- Northern Star ...	900 lbs.	2nd, 4th and 5th Nov., 1912	4	March, 1913	9,375 lbs.	Three trolley loads of kraal manure incorporated.
(3) Maize:-- "Hickory King" "German Yellow" "Iowa Silver Mine" "Bishop" (Yellow) "Minnesota King" "Funk's 90 Days" "Drought Proof"	10 lbs. 10 lbs. 10 lbs. 9½ lbs. 9½ lbs. 10½ lbs. 5 lbs.	20th, 21st, 22nd, 23rd Nov., 1911 27th, 28th, 29th, 30th Nov., 1911 16th, 18th, 19th, 20th Dec., 1911 5th and 6th Dec., 1911 4th Dec., 1911 8th Dec., 1911 15th Dec., 1911	20 20 20 5 2½ 2 ½	June, 1912	1,400 lbs. 1,150 lbs. 650 lbs. 980 lbs. 860 lbs. 655 lbs. 388 lbs.	The land on which the maize crop has been grown is very sandy and extremely poor in natural fertility with a subsoil of ironstone gravel. No manure or fertiliser was used. We have, this year, planted more varieties.
(4) Teff Grass ...	5½ lbs.	15th Nov., 1911	4	April, 1912	1 ton (with straw)	The quality of seed was poor and the germination was not very good. No manure or fertiliser used.
(5) Linsced (flax) ...	5 lbs.	14th Nov., 1911	½	April, 1912	108 lbs.	The demand for seed of this variety is great, consequently we have sown more extensively this year. No manure used.
(6) Butter Peas (York) ...	45 lbs.	6th Feb., 1912	2	May, 1912	255 lbs.	No manure used. Demand for green and dry peas locally.

GOVERNMENT DRY LAND EXPERIMENT STATION.—LICHTENBURG.

STATEMENT OF EXPERIMENTS ON CROPS HARVESTED IN 1912.

Variety.	Rate of Seeding (per Eng. acre).	Time of Seeding.	Number of acres planted.	Time of Harvesting.	Average Yield (per Eng. acre).	Remarks.
(7)						
Millets :—						
“Japanese”	10 lbs.	16th Nov., 1911	1	April, 1912	1½ ton (with straw)	No manure or fertilizer used.
“Golden”	10 lbs.	16th Nov., 1911	1	April, 1912	½ ton (with straw)	
“Boer”	10 lbs.	18th Nov., 1911	8	April, 1912	1½ ton (with straw)	
(8)						
Sunflower (Russian)	8 lbs.	2nd Jan., 1912	1	May, 1912	345 lbs.	No manure used. These sunflowers stop “sand drifts” when planted in “screens” round the fields or acre plots.
(9)						
Cowpeas	40 lbs.	2nd Jan., 1912	5	Ploughed under	as green manure	Maize planted on these plots this year.
(10)						
Vicia Villosa (Vetches)	18 lbs.	31st Dec., 1911	5	Ploughed under	as green manure	Soya beans planted this year.
(11)						
Lupines (white)	50 lbs.	3rd Jan., 1912	15	Ploughed under	as green manure	Maize planted this year.
Lupines (yellow)	5 lbs.	4th Jan., 1912	15	Ploughed under	as green manure	Peas, potatoes, barley and linseed planted.
(12)						
Velvet Beans	60 lbs.	5th Jan., 1912	1	Ploughed under	as green manure	Summer wheat planted this year.
(13)						
Kafir Beans	45 lbs.	12th Dec., 1911	1	Ploughed under	as green manure	Maize plant d.
(14)						
Barley :—						
Austrian	45 lbs.	8th July, 1912	1	30th Nov., '12	1,050 lbs.	Soil rather alkaline. No manure.
Boer	45 lbs.	8th July, 1912	2	Cut as green forage	for animal in Oct. and Nov., 1912	Average yield previous years was 1,125 lbs. to the acre.
(15)						
Wheat :—						
“Chernouka” (Durum)	37½ lbs.	9th May, 1912	1	5th Nov., '12	322 lbs.	300 lbs. of special wheat fertilizer used. The straw of this crop was long and heavy, but crop was badly damaged by frost during its flowering stage, hence the small grain yield.

GOVERNMENT DRY LAND EXPERIMENT STATION.—LICHTENBURG (Contd.).

STATEMENT OF EXPERIMENTS ON CROPS HARVESTED IN 1912.

Variety.	Rate of Seeding (per Eng. acre).	Time of Seeding.	Number of acres planted.	Time of Harvesting.	Average Yield (per Eng. acre).	Remarks.
"Chernouska" (Durum)	37½ lbs.	2nd July, 1912	5	28th Nov., '12	1,028 lbs.	Somewhat damaged by frost during flowering stage. Lupines grown and ploughed under previous year. No manure used.
"Chernouska" (Durum)	37½ lbs.	27th July, 1912	5	Destroyed by hail.	20th Dec., '12	Three trolley loads of kraal manure incorporated (per acre). This crop was excellent, both in grain and straw and was just ripe when hail-storm came.
(16) Minnesota (soft wheat)	37½ lbs.	22nd July, 1912	5	Destroyed by hail.	20th Dec., '12	Special wheat fertilizer (300 lbs. per acre). This crop was good in grain and straw.
Minnesota (soft)	37½ lbs.	11th May, 1912	2	6th Dec., '12	980 lbs.	This variety resists frost fairly well, but has, nevertheless, suffered severely. No manure used.
(17) Federation (soft var.)	37½ lbs.	24th July, 1912	2	Destroyed by hail.	20th Dec., '12	Two trolley loads kraal manure (per acre) incorporated. Crop was rather promising.
Federation (soft var.)	37½ lbs.	1st July, 1912	1	9th Dec., '12	1,015 lbs.	Legumes ploughed under previous year. No manure.
(18) Polish Wheat (Durum)	35 lbs.	15th July, 1912	1	18th Dec., '12	809 lbs.	Maximum yield per acre (1910) was from Beloturka also a durum. No manure.
(19) Kubanka (Durum)	37½ lbs.	3rd July, 1912	1	End Nov., '12	1,018 lbs.	Three trolley loads of kraal manure incorporated (per acre) in December, 1911. Crop suffered through untimely frost.
Oats:—						
"Algerian"	70 lbs.	2nd April, 1912	1	6th Nov., '12	1,894 lbs. (with straw)	No manure. Wheat was harvested previous year.
"Sidonian"	70 lbs.	2nd April, 1912	1	6th Nov., '12	1,771 lbs. (with straw)	No manure. Wheat was harvested previous year.

GOVERNMENT DRY LAND EXPERIMENT STATION.—LICHTENBURG (Contd.).

STATEMENT OF EXPERIMENTS ON CROPS HARVESTED IN 1912.

Variety.	Rate of Seeding (per Eng. acre).	Time of Seeding.	Number of acres planted.	Time of Harvesting.	Average Yield (per Eng. acre).	Remarks.
Rye ... (21) ...	45 lbs.	3rd April, 1912	3	Cut as green forage during drought		This crop did not suffer through drought, but it was not at all good looking. The soil is somewhat strongly alkaline.
Pea nuts (Virginian Mammoth) (22)	100 lbs.	27th Dec., 1911	1	May, 1912	1,065 lbs.	Not having the proper pea nutgering machinery, it is impossible to get all the nuts out of ground. No manure used.
Lucerne (Provence) ... (23)	15 lbs.	March, 1910	2	Three cuttings		No manure. Soil somewhat alkaline (Sodium Carbonate).
Sainfoin (Ornobrychis Sativa) (24)	5 lbs.	March, 1910	$\frac{1}{2}$	Poor animals of winter		No manure. Soil alkaline. This variety is a good winter feed and does fairly well on dry lands.
Phalaris Bulbosa (Grass) ... (25)	Roots planted	March, 1911	$\frac{1}{2}$	Cut as green forage during winter months		Grows well on dry lands and is an excellent winter grass. No manure.
Cotton (Cook's Long Staple) (26)	Successfully grown on small plots		...	...	...	These varieties will now be grown on larger scale. Coriander and Ginger in great demand by Indian community (locally).
Ginger (27)						
Clover (different varieties) ... Beggar Weed ... Bromus inermis ... (28)	These varieties were tried for two consecutive years with little or no success				...	Soil evidently not suitable.
Trees (forest) :— Eucalyptus Viminalis ... " Rostrata ... " Robusta ... " Stuartiana ... Callitris Robusta ... Cupressus Arizantica ... Acacia Cultriformis ... (29)	Planting— 1,250 per acre or on 6ft. squares	Planting— Jan. to April	...	...	...	We have every year planted a number of trees : in all, about 16,000, viz : Hedges, Windbreaks, etc. We have trouble with white ants, but for the rest the trees grow well. The fast-growing Stuartiana and Viminalis are great frost resistants, especially the first-named.
Fruit trees (Apples) :— " Monroe's Favourite ... " Senator ... " Versailles ... (30)	Planting— 25 ft. squares, viz : 25 ft. in row and rows 25 ft. apart	Planting— July to August, 1911	Number of trees planted— 300	...	...	These trees are growing well on dry lands and had fruit on this year (1912) which was beaten off by hail, 20th December, 1912.
Spanish Reed	Planted in hedge, 300 yds. long		...	...	...	Growing well.

FROST WAS REGISTERED.

	January, 1912	2-70 inches	June, 1912	... nil inches	November, 1912	... 0-10 inches	Sept., 1912.—From 1st to 17th every night; also on
February, "	... 5-77 "	"	July, "	... 0-10 "	December, "	... 4-46 "	21st, 22nd, 23rd, 24th, 26th, 27th, 28th, 29th and
March, "	... 4-39 "	"	August, "	... nil "			30th.
April, "	... 3-43 "	"	September, "	... nil "		4-56 inches	Oct., 1912.—1st, 2nd, 4th, 5th, 6th, 7th, 8th, 11th,
May, "	... 0-90 "	"	October, "	... 0-31 "			12th, 13th and 14th.
			Growing period of wheat crops	... 0-41 inches	N.P.—On 15th Nov., 1912, 0-03 inches; and on 16th Nov., 1912, 0-07 inches of rain fell.		Nov., 1912.—10th, 11th, 20th, 26th, 27th and 28th. Dec., 1912.—Light frost 22nd, 23rd and 27th.
Before sowing	... 17-19 inches						

STATEMENT OF RECEIPTS AND EXPENDITURE DRY-LAND EXPERIMENT STATIONS FINANCIAL YEAR 1912-13.

Revenue (including Transfers).	Lichtenburg.	Pietersburg.	Warmbaths.	Groenkloof.	Expenditure (including Transfers.)	Lichtenburg.	Pietersburg.	Warmbaths.	Groenkloof.
Sales and Transfers of Seed	£ s. d. .. 129 3 11	£ s. d.	£ s. d.	£ s. d.	<i>Administrative Charges.</i>	£ s. d. 470 0 0	£ s. d. 289 0 0	£ s. d.	£ s. d.
Sales and Transfers of Crops	£ s. d. .. 35 0 0	£ s. d.	£ s. d.	£ s. d.	Salaries and Allowances	£ s. d. 191 19 2	£ s. d. 109 16 6	£ s. d. 15 11 5	£ s. d.
					Transport and Travelling				
					<i>Purchase of Live Stock.</i>				
					Oxen	£ s. d. 97 8 8	£ s. d.	£ s. d.	£ s. d.
					<i>Labour.</i>				
					Wages	£ s. d. 786 12 10	£ s. d. 196 7 9	£ s. d. 216 7 4	£ s. d. 257 16 0
					<i>General Maintenance.</i>				
					Sundry Equipment	£ s. d. 14 14 7	£ s. d. 29 14 5	£ s. d. 11 1 0	£ s. d.
					Sundry Stores	£ s. d. 36 0 2	£ s. d.	£ s. d. 1 14 5	£ s. d.
					Implements and Tools	£ s. d. 57 19 5	£ s. d.	£ s. d.	£ s. d. 66 7 3
					Feeding Stuffs	£ s. d. 7 14 6	£ s. d. 10 15 6	£ s. d.	£ s. d.
					Manures	£ s. d. 56 16 1	£ s. d.	£ s. d.	£ s. d.
					Seeds	£ s. d. 29 19 6	£ s. d. 14 1 0	£ s. d. 4 14 9	£ s. d.
					<i>Transport.</i>				
					Wagons and Harness	£ s. d. 18 3 1	£ s. d. 40 13 0	£ s. d.	£ s. d.
					Sundries	£ s. d.	£ s. d.	£ s. d. 6 1 0	£ s. d. 3 11 0
					Railage and Transport	£ s. d. 20 8 6	£ s. d. 51 15 10	£ s. d. 28 4 2	£ s. d. 30 6 0
					<i>Permanent Improvements.</i>				
					Fencing	£ s. d. 6 7 4	£ s. d. 113 14 11	£ s. d. 3 6 0	£ s. d.
					Trees	£ s. d. 33 15 0	£ s. d. 14 13 0	£ s. d.	£ s. d.
					Entertainment of Visitors	£ s. d. 22 8 3	£ s. d.	£ s. d. 1 5 3	£ s. d. 1 14 0
Total Revenue ..	£ 164 3 11	£ ..	£ ..	£ ..	Total Expenditure ..	£ 1,850 7 1	£ 870 11 11	£ 288 5 4	£ 359 14 3

METEOROLOGICAL READINGS, LICHTENBURG DRY-LAND STATION.

January to December, 1912.

Monthly totals under column "Evaporometer."

Month.	Total Evaporometer Reading.	Remarks.
January	4.60	No reading on 3 days.
February	3.44	" " " 7 "
March	8.89	" " " 1 day.
April	5.75	" " " 3 days.
May	18.38	—
June	17.32	—
July	11.61	—
August	11.775	" " " 1 day.
September	9.913	—
October	7.488	—
November	12.640	—
December	8.374	—

Monthly totals under column "Rainfall."

RAINFALL.

January	2.70	... ..	On 8 days.
February	5.77	... ..	" 12 "
March	4.39	... ..	" 13 "
April	3.43	... ..	" 10 "
May	0.90	... ..	" 3 "
June ... ..	—	... ..	—
July	0.10	... ..	" 1 day.
August ... ..	—	... ..	—
September ... ..	—	... ..	—
October	0.31	... ..	" 3 days.
November	0.10	... ..	" 2 "
December	4.46	... ..	" 13 "

Inches	January.	February.	March	April	May	June.	July	August.	September.	October.	November.	December.
12												
11												
10												
9												
8												
7												
6												
5												
4												
3												
2												
1												
0												

Month	Precipitation (Inches)
January	2.8
February	5.8
March	4.2
April	3.3
May	0.7
June	-0.1
July	0.0
August	-0.1
September	-0.1
October	0.2
November	0.0
December	4.4

APPENDIX XX.

REPORT OF THE SUPERINTENDENT OF THE GOVERNMENT GUANO ISLANDS.

Office of the Superintendent of
The Government Guano Islands,
Cape Town, 4th June, 1913.

The Secretary for Agriculture, Pretoria.

In compliance with your request, I have the honour to submit the following Report upon the Administration of the Government Guano Islands for the period 1st January, 1912, to 31st March, 1913:—

Owing to circumstances which have been very fully explained in previous Annual Reports, and over which there is no control whatever, the whole of the transactions relating to any particular Season fall within the Calendar year. In consequence of this, all preliminaries connected with the various activities undertaken have, more or less, to be initiated in the beginning of January and developed concurrently with the progress of the year and, as the commencement and duration of these operations are regulated entirely by existing conditions,—which vary very considerably from year to year,—a statement embracing particulars relating to nine months of one Calendar year and three months of another would be very misleading, as it might very possibly happen, at any time, that an undue proportion of the revenue and expenditure belonging to the tail end of a late season and the beginning of a succeeding early one, respectively, or *vice versa*, would be brought into any one financial year and thus give a very distorted and erroneous idea of what had actually been achieved during any particular season.

To overcome this difficulty and at the same time bring my Report into line with those furnished by the Heads of other Divisions of the Agricultural Department, I think it would convey a more comprehensive idea of the work performed by the Guano Division during the period 1st January, 1912 to 31st March, 1913, if I were, in framing this Report as well as others for subsequent financial years, to give you a general statement of what has transpired during the period under review, and, in so far as statistics are concerned, to furnish you with details in respect to the last Calendar year falling partly within that period.

Proceeding on these lines, therefore, I have to state that my prognostications, with regard to the year 1912, have been amply justified by results, both as regards the Season's output of Guano and the abnormally increased demand for this product.

During this year, the Colonial Islands produced 2,210½ tons of Guano and the Northern Group 4,162, making in all a total yield, from all sources, of 6,372½ tons, which was a very fair average, as compared with previous normal seasons.

The whole of these collections (with the exception of 30 tons supplied to the Clanwilliam Dépôt) were brought up to Cape Town and disposed of during the year.

In addition to the foregoing, 1,246½ tons, of the reserve stock remaining on the islands at the end of 1911, were brought up early in January, 1912, and this, together with 261 tons of Guano in stock in the Central Dépôt at Cape Town at the beginning of the year, was all disposed of before the end of February.

The demand for Guano during the year 1912 was very much in excess of the supply, and, owing to the great bulk of the new season's collections not being available until May and June, it was quite impossible to meet all the requirements of the Grain Farmers in time for their ploughing and sowing season.

In consequence of this, a large number of applicants, who could not wait for their final allotments, had to be contented with from a half to two-thirds of the quantities applied for, whilst a good many others decided to do without Guano altogether rather than wait until they were able to get their supplies.

All orders received during January and February were executed in full during those months out of the reserve stock carried over from the previous year, but subsequent applications had to be dealt with on the allotment principle; delivery being given, in instalments, as shipments of the new season's collections arrived, from time to time, from the Coast.

None of the applications received during March, April and May were thus completed much before the end of June, or the commencement of July, and those booked in June and onwards correspondingly later.

The total number of orders booked and dealt with during the period from the 1st March to the 8th October, when the list had to be closed owing to the whole of the available stock for the year having been disposed of, was 3,657. Of this number 1,616 applications were received during March, April and May, and of these the first 895 applicants on the list were offered and many accepted their supplies in three instalments, and the remainder in two: all subsequent orders being executed, in full, in one allotment. In all 4,458 allotments, representing 57,139½ bags of Guano, were taken up and dealt with: the work of delivery of the same extending up to the end of November.

Many further applications were received after the list was closed, but had to be refused. A large number of these were verbal, of which no note was unfortunately kept, but of the written applications 159 were recorded, representing an additional demand for 4,100 bags of Guano, which quantity was all required for use during the latter portion of last year.

The total quantity actually applied for and recorded throughout the year was very close upon 100,000 bags, or 10,000 tons.

The total quantity of Guano disposed of and delivered to various districts throughout the Union during 1912 was 7,862 tons, and this was distributed as under:—

Cape Province.	Tons.	Tons.
Western and South Western Districts	7,305 $\frac{3}{4}$	
Other Districts	176 $\frac{1}{4}$	
	<hr/>	7,482
Transvaal.		
All Districts		275 $\frac{1}{2}$
Natal.		
All Districts		101
Orange Free State.		
All Districts		3 $\frac{1}{2}$
		<hr/>
Total		7,862 Tons.

All stocks of Guano having thus been disposed of, no further sales of Guano were effected during the rest of the period covered by this Report.

With regard to the first three months of the year 1913, there is very little to be said.

Owing to the breeding season throughout the Coast being somewhat later this year than usual, the collection could only be proceeded with on such of the islands as were ready and, in most cases, this was not started until after the 15th January on the Colonial Islands, and until the middle of March on the Northern Group.

The prospects in so far as the crop for 1913 is concerned are decidedly good, but it is quite impossible at the date of writing this report to give any reliable estimate of what the new season's total output will be, as the deposits have not yet all been collected.

Up to the end of March, 383 $\frac{1}{4}$ tons of Guano were brought up to Cape Town, which was all that was ready for shipment, from some of the smaller of the Colonial Islands, up to that date.

With no stock in hand at the commencement of 1913, and a late season to boot, the problem, as to the best method of distributing the very limited quantity of Guano which would be available for disposal this year, had to be seriously considered, and realising that the new season's collections, which were roughly estimated at about 6,000 tons, would be wholly inadequate to meet all demands throughout the year, it was decided that the fairest way of dealing with the difficulty would be to dispose of the prospective crop in two allotments, arranged, so far as circumstances would allow, in accordance with the seasonal requirements of the year.

The first allotment took place in the early part of March, when 4,500 tons were offered for sale, and, in response to a Government Notice calling for applications in connection with this allotment, 2,028 were received and booked—the total quantity of Guano applied for being 10,850 tons, or considerably more than double the quantity available for disposal.

The work of allotment was undertaken by a Committee specially appointed by the Government for that purpose. This was no very easy matter, as it was found that many of the applicants, realising that their orders would not be executed in full, had asked to be supplied with quantities considerably in excess of what their actual needs warranted.

All applications were given very careful consideration, and much labour was entailed in arriving at an equitable distribution of the Guano, and I would take this opportunity of placing on record my indebtedness to Drs. Juritz and Perold, who were associated with me on the Committee, for the valuable assistance I received from them in dealing with this most difficult question.

It was originally intended that the 4,500 tons should be allotted *pro rata* amongst applicants; but, upon going through the very large number of applications which had been received, it was found that, for several reasons, a distribution on those lines was quite impracticable, and it was decided, therefore, that the fairer method of dealing with the matter would be to apportion the Guano on the following basis, viz.:—

Applications for 10 bags or less, to be allotted in full; those from 11 to 70 bags, to be given one-half of the amount applied for, subject to a minimum of 10 bags per applicant; 71 to 360 bags, one-third of the amount applied for, with a minimum of 35 bags; and applications for 361 bags and upwards, one-fourth of the order, with a minimum of 120 bags.

Acting upon this principle, and applying the above scale, the following allotments were made:—

No. of applications.	Quantity applied for.	Grading and scale of allotment.	Quantity allotted.
423	3,352 bags	1-10 bags full	3,352 bags
414	7,869 „	11-20 bags, minimum 10 bags	4,140 „
751	32,210 „	21-70 bags one-half	16,147 „
213	18,555 „	71-105 bags, minimum 35 bags	7,455 „
191	32,325 „	106-360 bags, one-third ..	10,775 „
5	2,060 „	361-480 bags, minimum 120 bags	600 „
8	5,200 „	481-1,000 bags, one-quarter ..	1,300 „
2,005	101,571 bags		43,769 bags
13 gratis issues to other Govt. Departments	1,386 „	Full	1,386 „
10 Reductions and refusals	4,993		
Totals 2,028	107,850 bags		45,155 bags

It may be added that, previously to making these allotments, the applications received were, as far as possible, compared with those of the previous year, and all excessive orders were reduced to what appeared to be the more reasonable limits of 50 per cent. in excess of last season's requirements.

SEASON, 1912.

With regard to the Season 1912, all Islands, Rocks, etc., with the exception of Hollamsbird Island, which could not possibly be touched this year, were thoroughly cleaned and all Guano collected was shipped to Cape Town.

The following Return gives the yield of Guano and the quantities shipped from the various Islands and Rocks under my control, during the year 1912, as compared with the year 1911:—

Year.	COLONIAL GROUP.													NORTHERN OR ICHABOE GROUP.													Grand Total Tons.
	Malagas.	Lambert's Bay I.	Jutten.	Bird.	Foundlings.	Dassen.	Marcus.	Paternosters.	Elephant Rock.	Dyers.	Seal Island.	Dyker Klip.	N.W. Rock.	Total Tons.	Ichaboe.	Possession.	Halifax.	Penguin and Seal.	Mercury.	Pomona.	Sinclair's.	Plumpudding.	Hollams Bird.	Total Tons.			
Collected																											
1911	1116	1213	1033	200	333	Nil	813	692	264	Nil	264	2	143	1794	1936	446	145	20	145	55	50	55	Nil	2452	4647		
1912	1090	3083	218	203	112	101	753	594	403	Nil	Nil	..	..	2210	2552	768	200	253	163	95	78	50	Nil	4162	6372
Shipped to Cape Town																											
1911	1140	913	1033	283	333	Nil	813	692	264	Nil	264	2	143	1872	2611	973	Nil	60	265	108	87	80	Nil	4185	6058		
1912	1090	2783	218	215	112	101	753	594	403	Nil	Nil	..	..	2192	3107	1064	345	253	255	150	128	105	Nil	5408	7601

The only Guano left on the Coast at the end of the year was that still lying on Hollamsbird Island, estimated roughly at between 200 and 250 tons, which will, if circumstances permit, be removed during 1913.

Although the total sales for 1912 show an increase of 736 $\frac{3}{4}$ tons, as compared with those of the year 1911, this does not reflect the true state of affairs in so far as the actual increase in the demand is concerned, for reasons which have already been explained in this report.

The Western and South Western Districts of the Cape Province absorbed 7,305 $\frac{3}{4}$ tons out of the 7,862 tons sold, and notwithstanding the fact that the total quantity of Guano supplied to the other districts of this Province was less than that sold in 1911, the area of distribution was greater, as will be seen from the statement given hereunder.

With regard to the other Provinces, there was an appreciable increase in the demand from Natal, as well as the Transvaal; but in the case of the Orange Free State very little was asked for.

The following is a comparative statement of the quantities of Guano sold locally and distributed direct to the several districts in the Cape and other Provinces of the Union during the years 1911 and 1912 respectively:—

Cape Province.	
Year.	
	Paarl.
	Malmesbury.
	Cape.
	Stellenbosch.
	Caledon.
	Worcester.
	Tulbagh.
	Ceres.
	Swellendam.
	Piquetberg.
	Port Elizabeth.
	Robertson.
	Laingsburg.
	Fort Beaufort.
	Cathcart.
	East London.
	Mossel Bay.
	Stockenström.
	George.
	Humansdorp.
	Vryburg.
	Griqualand East.
	Stutterheim.
1911	17146
1912	17652
14084	10768
12392	18770
9106	9320
5764	7578
3283	3403
2061	1703
777	555
710	344
693	2407
300	285
216	197
97	53
60	113
55	221
50	20
20	29
17	33
10	20
10	27
2	35

Year.	Cape Province (continued).																		Other Provinces.				Total Bags.	Total Tons.
	Clanwilliam.	Albany.	Alwal North.	Prince Albert.	Victoria East.	Transkei.	Wodehouse.	Alexandria.	Uitenhage.	Uniondale.	Kimberley.	Bachurst.	Middelburg.	Craddock.	Tarka.	King William's Town.	Steynsburg.	Queenstown.	Transvaal.	Orange Free State.	Natal.	Rhodesia.		
1911	6	5	4	3	1	1	1	..	..	..	..	..	..	..	..	..	..	..	1703	132	15	20	68787 ¹ / ₂	6878 ³ / ₄
1912	..	80	..	6	10	23	..	217	194	171	20	18	13	12	10	6	4	1	2754	38	100	..	78099 ¹ / ₂	7810

DEPOTS.

In consequence of the enormously increased demand for Guano, and the desirability of controlling and undertaking the distribution of all available supplies from one main centre, the Dépôts at Clauwilliam and Storms River were closed on the 21st June, 1912, and all applicants for this product residing in the districts hitherto served by those Dépôts are now being supplied from Cape Town direct.

The only other Depôt which is being continued for the present is that at Knysna, where only a very small supply of Guano is stocked and sold annually.

The following is a comparative statement showing the quantities of Guano in stock, supplied to and sold at the undermentioned Dépôts during the year 1911 and 1912, respectively.

Guano in Depôts.	Clanwilliam.		Knysna.		Storms River.		Total Bags.	
	1911.	1912.	1911.	1912.	1911.	1912.	1911.	1912.
In stock on 1st January	31	62	92	44	23	16	146	122
Supplied to	319	300*	70	100	30	—	419	400
Sold at	287	361	120	144	37	16	444	521

* Supplied from Lambert's Bay direct.

The total Revenue realised from the sale of Guano for the year 1912, including that sold through the medium of the Depots, was £39,353 4s. 3d., in which is included the value of the "gratis issues" of 44 tons, supplied to other Government Departments during the year.

CHEMICAL COMPOSITION OF GUANO.

Samples of all Guano sold throughout this year were submitted for analysis. In all twelve determinations were made, and the average analytical composition of the stocks disposed of was as under:—

Nitrogen	11.51	Per Cent.
Potash	2.20	,,
Phosphoric oxide soluble in water	3.04	,,
Phosphoric oxide soluble in citrate solution ...	9.25	,,
Total phosphoric oxide	9.62	,,
Lime	9.66	,,

SALE OF PENGUIN EGGS.

The total number of Penguin Eggs sold during the Season 1912 was 400,500. These were all collected on Dassen Island, and the Revenue derived from the same was £2,052 11s. 3d.

SEALING.

Winter Season.

In consequence of the very disappointing experiences on the German South West African coast last year, no organised Sealing operations were undertaken on the leased Islets and Rocks on that Coast during the Winter Season this year.

A few Skins were obtained from the Steeples and adjacent Reefs and Rocks, as the result of the enterprise of a scratch crew from Ichaboe Island, but the number of Seals taken were not of much account, as only 478 skins were secured.

Sealing was, however, carried out on Sinclairs Island, of the Northern Group, as well as on Dyer's Island and Elephant Rock of the Colonial Group of Islands, during the period June-July, with very satisfactory results; the total number of Skins obtained for the Season from these sources being 3,559.

Summer Season.

Further Sealing operations were undertaken during the Summer Season (October to December), on Quoin Rock, near Dyer's Island on the Colonial Coast, and also on Sinclair's, Long and Hollamsbird Islands, as well as the leased Rocks, etc., on the German South-West African Coast, with the following results:—

From Quoin Rock... ..	38	Skins were obtained.
From Northern Islands	2,605	,,
Total	2,643	,,

With regard to the latter, as was the case last year, it was necessary to engage the services of a suitable vessel for the work.

The small Screw Steamer "Magnet" was accordingly Chartered and fitted out for this purpose, and carried out all operations to my entire satisfaction.

The Lease of the German Islets and Rocks expired on the 31st December last, and has not since been renewed, as, apart from other considerations, it has been discovered that the Agreement entered into, on the 17th November, 1897, between the Agricultural Department on behalf of the late Cape Colonial Government and the Deutsche Koloniale Gesellschaft, in respect to these Islets, etc., was *ultra vires* and not in keeping with the terms of the Protocol signed by representatives of the British and German Imperial Governments at Berlin on the 15th July, 1886.

As the question regarding the Sealing rights on these Islets and Rocks has, in consequence of this action, become a rather delicate and involved one, and would take up too much space, I will not enter into the details of the same in this report.

The following is a comparative return of Seal Skins obtained from all sources during the years 1911 and 1912:—

		Colonial Group.						Northern Group.				Grand Total Skins.	
Season.		Dyers' Island and Quoin Rock.		Elephant Rock.	Total Skins.		Various Islands and Rocks.		Total Skins				
		1911	1912	1911	1912	1911	1912	1911	1912	1911	1912	1911	1912
Winter	...	1941	1213	1139	834	3080	2047	752	1512	752	1512	3832	3559
Summer	...	Nil	38	Nil	Nil	Nil	38	1237	2612	1237	2612	1237	2650
Totals	...	1941	1251	1139	834	3680	2085	1989	4124	1989	4124	5069	6209

As will be seen from the foregoing return the total number of skins obtained from all sources throughout the year 1912 was 6,209, which were all shipped to London for disposal.

The nett Revenue derived from the sale of Seal Skins during the year 1912 was £6,266 15s. 7d., and the average price obtained per skin was 28s. 10½d.

These sales include the skins taken during the Summer Season of 1911 and Winter Season of 1912 only.

With regard to the skins taken during the Summer Season 1912, one shipment of these, comprising 1,527 Skins, was disposed of in March, 1913, and realised £1,838 11s. 8d., but the results of the sale of the last shipment comprising the balance of the season's catch had not yet come to hand up to the date of writing this Report.

Private Sealing enterprise still continues in the Colonial waters, but only four (4) licences were applied for and issued for the Season 1912. The total number of Skins secured by the licensed Sealers was 1,209, upon which a Royalty of £60 9s. was collected.

SEAL OIL.

There was practically no demand for Seal Oil this year. Only a very small quantity (40 gallons) was sold, which realised £4 16s. 8d. I can only attribute this sudden falling off in the demand for this product to the fact that large quantities of Whale Oil have been brought into the local Market, and which is being sold at a price very much below that charged for the Government article.

W. R. ZEEDERBERG,

Superintendent, Government Guano Islands.

APPENDIX XXI.

ANNUAL REPORT OF THE CHIEF INSPECTOR OF GRAIN.

Pretoria,
March 31st, 1913.

THE SECRETARY FOR AGRICULTURE.

I have the honour to submit my Report for the fifteen months ending March 31st, 1913, regarding the Maize Export Trade.

1912 CROP AND EXPORT.

Owing to the dry season experienced at the end of 1911, the production of Maize in the Union in 1912, was only about equal to that for 1911, and from 1st June to the beginning of December, when the Maize export came to a standstill, owing to the prolonged drought, 623,992 bags of the 1912 crop were exported by sea. No maize has been exported since the early part of December, and since then, instead of exporting Maize, the Union has actually imported about 200,000 bags, made up of 30,000 bags of South African Maize, brought back from Europe, and the remainder North American and Argentina grain.

I might here mention that the condition of the American Maize (both North and South, on arrival has been far from satisfactory, chiefly owing to weevil.

During the past season over 200,000 bags of Maize were forwarded by rail to territories north of the Limpopo; these do not show in my Returns of Maize exported, which only cover Maize graded and shipped at Union Ports.

There having been no Maize graded and shipped since 31st December last to date, I have made up my Returns for the calendar year, for the purpose of facilitating comparison with previous years on previous returns. In future Returns will be made up for the year ending 31st March; and annual Returns will also, as hitherto, be issued to Chambers of Commerce and Agricultural Unions in June showing the actual crop export, that is from 1st June to 31st May.

REJECTED MAIZE.

One satisfactory feature to be noted is that, whilst in 1911, 147,302 bags Maize were rejected at the ports by the graders as being wet or mouldy, only 45,699 bags were so rejected during the period under review.

Every effort has been put forth by this Division during the year to impress upon producers and traders the necessity of seeing that their grain is sufficiently dry for shipment before railing it.

In numbers of cases the grain has been tested, free of charge, by this Division, and the moisture content made known to the consignor before railing.

Until traders, Chambers of Commerce, or Agricultural Unions, in the maize producing districts provide themselves with moisture testers there will always be a certain amount of maize rejected at the coast as wet, entailing a loss upon someone up-country, and endless trouble and confusion at the ports.

STATISTICS.

Appendices A., B., C., and D. give full details of maize graded, rejected and shipped, at all the ports of the Union during 1912.

It will be noted that Australia has now become a purchaser of South African maize, and recognises the value of our Grader's Certificates; 235,644 bags of graded maize having been shipped from the Union to the Commonwealth during 1912, whereas no graded maize was shipped thereto during 1911.

ANNUAL MAIZE CONFERENCE.

On the 1st and 2nd April, 1912, the Annual Maize Conference, presided over by Mr. P. J. du Toit, Under-Secretary for Agriculture, was held in Pretoria, attended by representatives of all bodies interested in the production and export of maize; the resolutions passed thereat, and the decisions come to thereon by the Government, are shown in Appendix "E."

GRADING.

Only one complaint was received, and that from Antwerp, during the 15 months to date, to the effect that a shipment of No. 1 White Flat Maize, shipped at Durban, was not up to the standard.

Enquiries made into the matter seem to fully prove that some of the maize delivered to the consignee at Antwerp by the Shipping Company was part of consignments of No. 2 White Flat, and we have evidence to prove that some of the No. 1 shipped was delivered to the wrong consignees as No. 2.

BILLS OF LADING.

The question of a bill of lading for South African grain, which will be acceptable to the London Corn Trade Association and the Continental buyers, has had the attention of the High Commissioner in London, who was informed in October, 1912, by the chairman of the South African Committee of the London Corn Trade Association that:—

"Although he (the Chairman) is most anxious that the question of a Grain Bill of Lading for South African maize should be settled as soon as possible, neither he, nor the other South African merchants, can discuss the question at the present time, owing to the fact that they are busily engaged in negotiations connected with the question of Rebates, etc."

The Trades Commissioner adds:—

"I am keeping this matter well before me, and will report to you what action is being taken as soon as the other freight questions have been settled."

In this connection I would state that the new Maize Freight Contract contains a form of bill of lading for bulk cargoes, but not one for maize in bags.

FREIGHTS.

The new Maize Freight Contract between the Government and the Union-Castle Mail Steamship Company, Ltd., entered into during the year 1912, in connection with the Mail Contract is a very satisfactory one, assuring shippers of a fixed low rate for a period of years, and sufficient tonnage when wanted, subject to due notice being given by shippers, to meet all demands.

As time goes on it will be seen that Government has secured to shippers a rate lower than that obtaining in any other part of the world, length of voyage being considered.

STANDARD SAMPLES.

Type Samples for the 1912 season were duly made up, and were sold to applicants for same in South Africa at 5s. per set.

200 lbs. of each grade were sent to the Trades Commissioner in London, and sets were supplied by him, free of charge, to the different Corn Exchanges and Chambers of Commerce in Great Britain and on the Continent.

OATS.

The export of graded oats during 1912 was 99,079 bags, as against 13,121 bags in 1911.

The recent crop was a record one, but, owing to the drought creating a great demand on the Western Province for feed and fodder for the Inland Provinces, it is not expected that the export of oats for 1913 will be very considerable.

GENERAL.

Owing to the small quantity of maize exported through Port Elizabeth and East London since April, 1911, it has been decided to do away with the post of Salaried Grader at these ports; and gentlemen, nominated by the respective Chambers of Commerce at these Ports, and whose qualifications are considered by this Department as perfectly suitable for the position, have been appointed on payment of a tonnage basis and a small monthly retaining fee.

During the present extended slack season it has been arranged that the Grading Staff at Cape Town and Durban, who are whole-time officials, and thoroughly reliable graders, shall be employed in other Divisions of the Agricultural Department.

At present it is difficult to say whether any of the 1913 Union maize crop will be available for export oversea, recent weather conditions have been favourable to the growing crops, and there seems every probability that this year's maize crop will be as large as last year's, and should early rains allow of ploughing on a large scale taking place during September and October next, it may be anticipated that a certain quantity of the 1913 crop will be exported.

During the past fifteen months I have toured all the principal maize producing districts, and visited the principal Agricultural Shows, placing myself in touch with up-country farmers and traders interested in the production and export of maize; I have also made several visits to all the ports to inspect the work being done, and to discuss with shippers any question arising connected with the export of grain.

It is pleasant to be able to state that the general opinion, up-country and at the coast, and also in overseas consuming centres, is that the grading is being done in a very consistent and reliable manner, and there is no doubt that our Grain Certificates have an excellent reputation both in Europe and Australia.

Expenditure for Financial Year, 1912-13	£3,566
Revenue for Financial Year, 1912-13	£1,900

In conclusion, I desire to tender my thanks to the officials of the Department of Railways and Harbours, and especially to the Port Managers and their Staffs, for their courtesy and assistance at all times to the officers of this Division.

G. F. NUSSEY,

Chief Inspector of Grain.

ANNEXURE "A."

MONTHLY GRADED MAIZE EXPORTS. CALENDAR YEAR 1912.

1912.	Durban.	Cape Town.	Algoa Bay.	E. London.	Totals.
Jan.	12,423	..	4,215	533	17,171
Feb.	4,851	160	..	1,176	6,187
March	40,932	160	..	..	41,092
April	60,415	1,662	..	..	62,077
May	57,035	22,988	2,200	..	82,223
June	16,254	15,190	6,836	..	38,280
July	32,263	26,208	7,728	3,211	69,410
August	129,685	70,876	4,093	3,749	208,403
September ..	135,764	91,297	1,607	5,912	234,580
October	12,452	44,166	3,830	1,451	61,899
November ..	2,229	8,775	..	..	11,004
December ..	..	416	..	..	416
Totals	504,303	281,898	30,509	16,032	832,742

ANNEXURE "B."

DESTINATION GRADED MAIZE EXPORTS. CALENDAR YEAR 1912.

To	Durban.	Cape Town.	Algoa Bay.	E. London.	Totals.
Antwerp ..	181,460	34,293	7,614	..	223,367
Hamburg ..	182,512	14,765	4,112	3,829	205,218
London ..	54,470	7,356	2,967	..	64,793
Liverpool ..	11,040	29,138	..	..	40,178
Southampton ..	..	2,240	..	..	2,240
Swansea ..	..	2,190	..	..	2,190
Belfast ..	25,695	3,699	..	..	29,394
Canaries ..	25,563	..	..	..	25,563
Brisbane ..	..	18,421	7,734	..	26,155
Melbourne ..	..	16,164	..	..	16,164
Newcastle ..	..	8,120	..	..	8,120
Sydney ..	21,986	133,055	8,082	11,825	174,948
Townsville ..	..	10,277	..	..	10,277
Inter Colonial ..	1,577	2,180	..	378	4,135
Totals ..	504,303	281,898	30,509	16,032	832,742

ANNEXURE "C."

MAIZE REJECTED DURING 1912.

	Durban.	Cape Town.	Algoa Bay.	East London.	Totals. 1912.	Totals. 1911.
Mouldy	14,667	1,523	561	10	16,761	25,590
Wet	12,304	16,405	219	10	28,938	121,712
Weevily	15,827	1,188	250	222	17,487	8,865
Bad Bags ..	1,478	8	..	..	1,486	?

Oats rejected at Cape Town.. .. . 981 Bags.

VARIOUS SHIPPED.

	Durban.	Cape Town.	Algoa Bay.	East London.	Totals. 1912.	Totals. 1911.
Oats .. ..	..	99,079	..	..	99,079	13,121
Chop	41,523	799	686	..	43,008	40,058
Barley .. ..	..	500	..	..	500	nil.
Kaffir Corn ..	..	..	..	..	nil.	110
Maize .. ..	..	..	..	..	..	..
Re-dried .. ..	..	970	..	..	970	34,357
Weevily	11,016	..	..	205	11,221	709

ANNEXURE "D."

SOUTH AFRICAN GRADED MAIZE EXPORTS. CALENDAR YEAR 1912.

Grades.	Transvaal.	O. Free State.	Natal.	Cape C.	Totals.
F.W. 1	3,786	7,095	26,473	..	37,354
2	354,508	134,431	34,152	140	523,231
3	5,082	21,762	100	..	26,944
F.Y. 4	47,807	13,328	2,304	..	63,439
R.W. 5	249	611	..	..	860
R.Y. 6	30,038	139,529	925	..	170,492
F.M. 7	283	257	..	..	540
R.M. 8	400	6,100	..	..	6,500
B.G. 9	2,504	878	..	..	3,382
1912 Totals ..	444,657	323,991	63,954	140	832,742
1911	652,254	314,731	41,566	7,892	1,016,443

	Durban.	Cape Town.	Algoa Bay.	E. London.	Totals.
F.W. 1	33,167	4,187	..	..	37,354
2	377,013	127,293	12,626	6,299	523,231
3	24,519	2,425	..	..	26,944
F.Y. 4	15,181	42,730	5,476	52	63,439
R.W. 5	667	193	..	..	860
R.Y. 6	46,119	104,094	10,601	9,678	170,492
F.M. 7	162	326	51	1	540
R.M. 8	4,431	314	1,755	..	6,500
B.G. 9	3,044	336	..	2	3,382
1912 Totals ..	504,303	281,898	30,509	160,32	832,742
1911	460,671	297,869	202,497	55,406	1,016,443

ANNEXURE "E."

RESOLUTIONS passed at the Annual Maize Conference held at Pretoria on 1st and 2nd April, 1912, and the decisions come to thereon by the Government.

Resolution 1:

That in future the Minutes of the Maize Committee be properly tabulated, and that a summary of Resolutions be attached thereto; also that such Resolutions be read out to the meeting and confirmed by the delegates before adjourning.

This resolution has been accepted by the Government, and is now being carried out.

Resolution 3:

That it be a recommendation to Government to appoint the Under-Secretary for Agriculture as a permanent chairman of the Annual Maize Committee, and to appoint also a permanent Secretary to the Committee.

As far as possible this will be done to preserve continuity of procedure.

[U.G. 47—'13.]

Resolution 4:

That, whilst this meeting recognises that its powers can only be in the nature of an advisory committee, it considers that Government should not alter any regulations (Railway, Grading and others), without giving the Committee an opportunity of discussing such questions; and that the Agricultural Department be requested to take charge of matters connected with the export of grain, and that that Department convene meetings of the Committee whenever desirable.

As far as this Department is concerned the various bodies represented at the Conference will be consulted when such a course can be adopted, in its opinion, without detriment to the maize export trade.

The Railway Administration reply that, so far as Railway Regulations are concerned, the Administration cannot agree to the terms of this Resolution. In Railway working questions arise which necessitate prompt action being taken and this proposal, if adopted, would hamper the Administration in the carrying out of its business.

Resolution 5:

That all maize consigned for export should be checked by the Railway Authorities at all stations, excepting sidings, and that an extra charge, if necessary, be made not exceeding 6d. per ton, and that the Administration accept responsibility for numerical shortages; this Committee hopes, however, that the Railway Administration will not find it necessary to levy any extra charge.

The Railway Administration accepts responsibility for numerical shortages at the present time on grain forwarded at stations, provided consignors pay a charge of 1d. per bag for checking purposes. Beyond this the Administration is not prepared to go.

Resolution 7:

That the principle of grading each bag be maintained, and that uniformity be brought about at the several ports, taking the system lately practised at Cape Town during 1910-11 as the basis of that uniformity.

The Railway Administration, on the decision of the Government, has issued instructions that the floor system of grading should be re-introduced at Cape Town, thus bringing all ports into line.

Resolution 10:

That is be a recommendation from this Committee that grain railed for export may be stored at private-owned convenient stores at the ports under the control of the Railway Administration until tonnage is available.

This the Railway Administration is prepared to consider, but it must, of course, be understood that if the methods proposed be adopted it will entail the establishment of a system of bonded warehouses, and will incur an extra service being rendered by the Administration for which remuneration will be required.

Resolution 11:

That any maize rejected on account of excessive moisture be allowed exportation at export rate without a Government certificate, as long as such can be arranged in separate holds from certificated grain.

This resolution the Railway Administration cannot agree to, and if wet grain is shipped without being dried to the satisfaction of the grader full ordinary rates must be paid.

Resolution 12:

That the present minimum moisture of 12.5 be maintained until a complete series of tests has proved that it may safely be increased. The tests to be carried out as soon as possible.

Permission was given in June to last shippers at Cape Town and Durban to make test shipments on their own account under Government supervision, the export rail rate to be granted on such shipments. Only one shipment of 600 bags was made, and this in a steamer only part full and carrying no other grain. The report of the Trades Commissioner on this shipment showed that the maize arrived in England in "dry and good condition," but one test shipment, especially one conducted under such conditions, is not sufficient to enable this Department to arrive at the decision to increase the allowance of moisture in maize for export under grader's certificate.

Resolution 14:

That in the opinion of this Committee it is necessary that a few travelling inspectors should be at the disposal of the Chief Inspector of Grain, so as to enable him to send them to fardarding stations from which grain in unsatisfactory condition has been forwarded.

Government is not prepared to agree to this resolution. Inland growers and dealers should avail themselves of moisture testers, and where they do not possess a testing machine it is for them to avail themselves of the facilities offered by this Department in Pretoria, and at any of the ports, for testing samples of maize for moisture content.

Resolution 15:

That the Railway officials be made responsible for seeing that all trucks are clean, and that sheets are sound and securely fastened down, and if loss is caused through their negligence the Railway Authorities should compensate consignors therefor.

All consignors have been requested to reject trucks which are not clean, but if such are used by them the Administration cannot be held liable in view of the definite request made to all concerned with grain export trade.

Resolution 16:

That each truck of maize for export be separately weighed and re-tared, and that proper precautions be taken to effect an efficient system of checking to secure more accurate weighing.

Generally speaking vehicles are weighed separately, but weigh-bridges are being built which will weigh more than one truck at a time. There does not appear to be any real necessity for each vehicle to be weighed separately under such circumstances, provided that each truck is weighed after unloading or prior to loading.

OSTRICH INVESTIGATIONS.

ANNUAL REPORT BY PROF. DUERDEN.

For some time past the Government has given financial assistance to Professor J. E. Duerden, M.Sc., Ph.D., A.R.C.S., of Rhodes University College, Grahamstown, towards certain investigations he has been conducting with a view to discovering the cause of the bar defects in ostrich plumes. Subjoined is a short report by him on the work done between 1st April, 1912, and 31st March, 1913:—

“The primary object of the investigations was the discovery of the cause of the bar defects in ostrich plumes. These have been shown to be due, in the first instance, to the difference between the blood-pressure and consequent difference in vigour of feather-growth during the day and night periods. While the day and night variation is a structural feature in the growth of all feathers it appears as a serious defect in the fully grown plume only under certain conditions, and it is now found that much can be done by proper management of the ostrich to eliminate the defects altogether.

“As a result of this discovery the investigations have necessarily concerned themselves with practically all sections of the farm management of the ostrich, such as feeding, clipping and quilling, feather and socket protection, breeding, chick-rearing, and the general farm treatment of the many diseases to which the ostrich is subject. The attempt is being made to place every branch of ostrich farming on a thoroughly sound scientific basis, and to replace mere opinion and ascertain by actual experimental data. Numerous birds are kept under close observation in experimental camps so as to compare different methods of treatment, and an extensive correspondence is maintained with ostrich farmers throughout the Union, and advice and assistance given wherever possible.

“The following contributions, under the general heading ‘Experiments with Ostriches,’ Nos. XVIII. to XXI., dealing with the investigations, have appeared in the *Union Agricultural Journal* during the period under review:—

“January, 1912, ‘The Anatomy and Physiology of the Ostrich. A. The External Characters.’

“March, 1912, ‘The Anatomy and Physiology of the Ostrich. B. Pterylosis.’

“April and May, 1912, ‘The Anatomy and Physiology of the Ostrich. C. The Internal Organs.’

“August, 1912, ‘Feather Irregularities.’

“In addition to the above a series of shorter articles and replies to correspondents have appeared from time to time in the various popular journals devoted to Agriculture in South Africa as well as reports of lectures delivered in several centres. Among the subjects so treated are: The Scientific Breeding of the Ostrich, Mating, Nesting, Incubation, Chick Rearing, Plucking, and Quilling, Hardness and softness in Feathers, Caponising of Ostriches, Wire-worm, Tape-worm, Chick Fever, Paralysis in Ostriches, Feather Blanks, Feather Protectors, Protrusion of Cloaca, and Diseases of Chicks.

“*Anti-plumage Campaign.*—Much ignorance exists in England, on the Continent, and elsewhere, as to the methods of taking the plumes of the ostrich, and attempts have been made from time to time to prejudice the ostrich industry by asserting that cruelty is involved in the plucking of the plumes. Various articles on the ostrich have therefore been written, and circulated abroad, pointing out the true facts of the case, and establishing on physiological grounds the entire absence of any cruelty. Information of this character has also been supplied to Mr. Chiappini, the Trades Commissioner in England.

and to Mr. Oscar Evans and Mr. Buckland, all of whom have done great service in demonstrating to the public abroad the entire absence of cruelty in ostrich farming, and the generally pampered condition under which the ostrich exists in its domesticated state. There is a necessity for being ever on the alert with such authoritative information to meet ignorant or prejudiced statements concerning the industry, for if allowed to pass unnoticed they would unquestionably damage the industry.

“Ostriches in British East Africa.—At the invitation of the Director of Agriculture of British East Africa I paid a visit to the Protectorate during the summer vacation to advise upon the prospects of the industry there. The various settlers have now about one thousand birds, all derived from chicks hatched in wild nests. Much valuable information was obtained which throws light upon the original foundation strains with which ostrich farming commenced in South Africa. It was found that East Africa possesses plumes with just as much length, breadth, density, lustre and shapeliness as in South Africa, but not combined in any one strain. What South Africa has been doing during these fifty years of ostrich farming is to combine by selective breeding all these various points in a single strain; and East Africa will have to carry out the same process with her original strains if she is to reach a feather standard approaching that of South Africa. The same parasitic diseases were found to occur there as among our own ostriches. The bird and its plumage differ in many minor points from those in South Africa, but not with sufficient constancy to mark a distinct species. Judging from the specimens seen the plumage of the East African bird is of exactly similar type to that of the birds secured by the recent North African expedition.”

APPENDIX XXIII.

WEATHER CONDITIONS.

A brief report reviewing weather conditions in the Union during the period of this report has been supplied by Mr. Stewart, of the Météorological Branch, Department of Irrigation, and is subjoined:—

“The period January, 1912, to April, 1913, was one of high temperatures and severe drought. In most parts of the Summer Rainfall Zone the rainfall failed in the latter half of the 1911-12 season, and thus the ensuing drought was intensified by low rivers and depleted dams and wells. But in some parts, such as the South-west of the Transvaal and the North and North-east of the Orange Free State, the effects of the lack of precipitation at the beginning of the 1912-13 season were mitigated in some measure by heavy rains in February, 1912. It must, however, be borne in mind that the intensity of these rains somewhat marred their beneficial effects, and to appraise them on the basis of the actual amounts recorded would be misleading.

“In the North of the Transvaal but little precipitation fell during January, 1912, and a considerable shortage had therefore to be faced at the commencement of the period. From then onwards, excepting April, when only a small proportion of the year's rainfall was to be expected, a regular augmentation of the deficit continued until February, 1913. A slight recovery then occurred; but this was temporary, and the previous failure stretched into the next month. In the centre of the Province the conditions were almost similar, although partial recoveries occurred in February of both 1912 and 1913, while in December the normal for the month was just reached. In the South-Western districts of the Transvaal, following the heavy downpours, to which attention has already been directed, a deficit was recorded in March, and then, from July until January, not an inch and half of rain fell.

“The conditions in the North and North-East of the Orange Free State were similar to those in the districts last described. Notwithstanding that in the North-East, March, 1912, was rather dry, the rainfall during the latter part of 1911-12 rain-season was not unsatisfactory, and the good rains of December broke the drought earlier than in the South-West Transvaal. The centre of the Province was more unfortunate. Considerable deficits in January and March, 1912, were repeated during the subsequent months, with monotonous regularity. In April and in the following December and March there were certainly indications of recovery, and although the rains then experienced could not, in such extraordinary circumstances, have their ordinary effects, they alleviated in some degree the prevailing distress.

“In Natal the precipitation at the beginning of 1912 was not altogether unsatisfactory, indeed the whole period with which we deal can scarcely be characterised as droughty. It is true, however, that March and April were rather dry, and that the rains of the succeeding season were rather tardy in their appearance and below the normal in amount.

“In the Cape Province the conditions were almost identical with those which prevailed in the South-West of the Transvaal; relatively heavy rains in February being followed by a period of drought extending to December. On the Southern Karroo, periods of normal conditions followed both a dry and a wet spell, and then from September onwards the normal was seldom reached. In Kaffraria an almost unbroken drought existed until December. In April, June and July the normals were certainly reached; but this has little significance when it is considered that during those months the usual rainfall bears but a small ratio to the yearly total. Although on the Cape Peninsula the late commencement of the 1912 rain season created some disquiet and led to many pessimistic prognostications as to the future, the good rains of April were sufficient to allay all fears. The succeeding months, however, fully justify the original pessimism; deficit followed deficit, and not until August were normal conditions restored.

[U.G. 47—'13.]

“ After this brief discussion, it will be interesting to consider the drought over the Summer Rainfall Zone at the beginning of the 1912-13 season, in comparison with that of 1897. The following table shows the former more severe in itself, and to have been further aggravated by a greater failure towards the end of the preceding season ”:—

Station.	Rainfall, 1st January to 30th June.			Rainfall, 1st July to 30th November.		
	1912.	1897.	Normal.	1912.	1897.	Normal.
	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
Komatipoort ...	10·33	—	17·10	0·94	—	6·02
Louis Trichardt ...	16·44	—	17·96	1·74	—	6·52
Johannesburg ...	14·26	19·73	17·25	2·57	5·75	7·25
Zeerust ...	10·86	—	15·54	1·17	—	5·34
Pretoria ...	13·13	—	17·29	1·83	—	7·93
Mbabane ...	22·93	—	28·04	7·12	—	13·11
Bloemfontein ...	9·79	11·26	14·51	1·76	3·53	5·49
Durban ...	15·09	16·40	19·48	5·75	13·40	15·82
Vryburg ...	14·04	9·21	19·28	0·79	0·58	3·06
Pella ...	0·80	2·60	3·86	Nil.	Nil.	1·92
Hopetown ...	8·82	8·83	9·40	0·09	0·11	2·74
Murraysburg ...	4·34	6·16	7·85	0·21	1·11	2·81
Aliwal North ...	12·51	10·94	15·81	1·22	1·59	6·16
Queenstown ...	11·25	4·77	14·60	1·62	0·90	6·65
Kokstad ...	15·41	17·80	14·84	2·89	2·29	7·90
Umtata ...	9·93	17·54	14·24	2·35	3·08	10·04

APPENDIX XXIV.

UNION DEPARTMENT OF AGRICULTURE.

RETURN OF EUROPEAN STAFF ACTUALLY EMPLOYED ON 31ST MARCH, 1913.
PROVIDED UNDER VOTE VI.—AGRICULTURE.

Division.	Administrative and Clerical Officers.	Professional and Technical Officers and Officers in Charge of Experiment Stations and Farms.	Field Officers, Inspectors, Guards, etc.	Miscellaneous Minor Appointments, Lay Assistants, Foremen, Boy Clerks, Messen- gers, etc.	Total.
A. Administration ..	74*	..	..	13	87
B. Veterinary ..	14	56	244	4	318
C. Sheep † ..	17	9	414 (1)	7 (2)	447
D. Bacteriology ..	13	11	..	32	56
E. Dairy ..	1	7	..	1	9
Cold Stores, Pieter- maritzburg ..	1	2	..	1	4
F. Botany ..	1	3	..	..	4
G. Plant Pathology..	1	3	..	4	8
H. Tobacco and Cotton	4	6	2	18	30
J. Horticulture ..	1	4	1	5	11
		(1 Fruit Inspector)			
K. Viticulture ..	1	3	1	5	10
L. Entomology ..	6	5	11	2	24
M. Chemistry ..	..	2	..	1	3
N. Publications ..	6	1	..	5	12
O. Cooperation ..	6	..	..	1	7
P. Fencing ..	7	..	1	3	11
Q. Dry Lands ..	..	1	1	..	11
R. Guano Islands ..	6	..	1	.. (3)	7
S. Field Cornets ..	..	..	55 (4)	..	55
T. Grain ..	2	3	..	2	7
	161	115	731	113	1,121

* Includes Central Accounting, Registry and Typing Offices numbering 54.

(1) Includes 76 Transvaal Field Cornets.

(2) A large number of temporary dipping supervisors are employed as required from time to time.

(3) European labour varies; 101 European and Colonial Foremen and Labourers employed on 31.3.13.

(4) Orange Free State only (part time officers). Transvaal Field Cornets included in sheep.

† Includes Ermelo Stud Farm.

In addition to the above the Department employed approximately 760 native labourers and 163 native constables assisting sheep inspectors, on the date mentioned.

APPENDIX XXV.

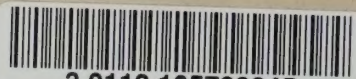
RETURN SHOWING VALUE OF IMPORTATIONS INTO AND VALUE OF CONSUMPTION
WITHIN THE UNION OF CERTAIN AGRICULTURAL PRODUCE AND ARTICLES
CONNECTED WITH AGRICULTURE DURING THE YEARS 1911 AND 1912.

Produce or Article.	1911.		1912.	
	Im- ported.	Con- sumed.	Im- ported.	Con- sumed.
	£	£	£	£
Agricultural Machinery	196,417	192,929	221,092	219,853
Agricultural Implements	402,388	387,478	448,794	434,365
Manures and Fertilisers	102,724	102,691	124,511	124,107
Seeds	53,329	51,939	41,481	40,235
Sheep Dip	74,197	77,621	90,803	87,756
Beans and Peas	27,381	26,199	41,520	41,153
Dholl	14,285	14,175	19,314	18,292
Flour, Wheat and Wheaten Meal	596,695	604,198	498,464	496,539
Maize	213	215	3,885	67
Malt	91,928	91,053	95,434	95,731
Oats	3,668	3,455	3,663	3,221
Wheat	550,691	503,506	395,265	396,760
Oatmeal	48,812	58,124	48,168	55,802
Fruit, Fresh (including Nuts)	57,358	55,132	74,829	72,351
Fruit, Dried or Preserved and Dates	76,775	73,479	76,034	72,951
Rice	332,556	316,599	389,815	384,125
Sugar and Sugar Products	596,042	589,490	409,835	409,119
Butter and Butter Substitutes	250,244	234,675	318,530	286,385
Cheese	143,640	138,431	158,787	153,372
Milk, Condensed	405,304	380,790	424,460	424,269
Eggs, Fresh	57,297	55,218	69,753	66,594
Hams, Bacon and Salted Meats	232,164	214,913	225,775	216,768
Lard	62,179	50,342	43,642	42,511
Beef	73,976	71,944	88,270	58,271
Mutton	32,308	26,442	25,450	15,279
Poultry	8,213	5,845	8,757	7,054
Game	860	1,183	919	1,003
Meats, Tinned and Preserved	133,871	114,710	125,818	115,770
Biscuits and Cakes	65,344	61,539	71,645	67,528
Confectionery, Jams and Jellies	289,793	277,377	288,127	283,286
Fish, Fresh, Dried and Preserved	241,092	228,764	271,651	255,277
Pickles, Sauces and Condiments (including Spices and Turmeric)	85,247	81,218	93,968	89,062
Hops	26,524	26,503	40,785	41,206
Tobacco, Raw and Partly Prepared	50,078	45,381	39,574	41,538
Water-boring Machinery	14,556	6,383	23,815	19,131
Fencing Material: Wire, Standards, &c.	519,166	512,403	457,374	458,249
Binding Twine and Harvest Yarn	18,364	18,279	18,179	18,099
Cement	104,405	99,755	114,921	103,892
Saddlery and Harness	75,343	73,409	81,825	79,150
Tobacco: Cigars, Cigarettes and other Manufactures	138,528	112,834	136,666	125,238
Potatoes	10,587	9,548	39,330	35,972
Windmills	49,546	48,655	65,586	64,008
Timber and Wood (Unmanufactured)	876,855	884,095	825,280	847,942
Whiskey	250,006	225,060	262,996	229,662
Brandy	63,484	60,061	69,710	61,985
Spirits, Potable (other than Whiskey and Brandy)	41,372	35,953	41,692	37,096
Wines	83,259	64,565	73,001	63,053

APPENDIX XXVI.

RETURN SHOWING VALUE AND QUANTITIES OF CERTAIN ARTICLES AND PRODUCE
CONNECTED WITH AGRICULTURE, BEING SOUTH AFRICAN PRODUCE EXPORTED
FROM THE UNION OF SOUTH AFRICA DURING THE YEARS 1911 AND 1912.

Produce or Article.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
		£		£
Animals Living .. .. .	..	45,388	..	30,988
Bark (lbs.)	111,205,090	289,556	118,207,599	283,010
Buchu Leaves (lbs.)	212,082	29,647	223,021	38,264
Maize (lbs.)	206,554,439	402,680	192,775,746	443,492
All other Corn, Grain & Meal (lbs.)	10,891,493	29,188	30,411,989	94,609
Ostrich Feathers (lbs.)	826,992	2,253,140	999,704	2,609,638
Fruit, fresh, including Nuts .. .. .	..	45,572	..	54,735
Hair Angora (lbs.)	21,066,825	917,874	23,479,729	967,286
Hay & Fodder (lbs.)	12,612,620	29,124	18,004,804	44,422
Hides and Skins .. .. .	..	1,211,527	..	1,691,014
Horns .. .. .	..	11,691	..	14,668
Meats (lbs.)	322,308	7,249	502,336	11,533
Sugar (Molasses & Treacle) (lbs.)	7,374,344	11,617	10,328,999	13,597
Tobacco (lbs.)	84,506	6,725	141,316	9,963
Tobacconists' Wares (Calabashes) .. .. .	..	26,647	..	27,789
Wines (gallons)	67,940	13,865	61,860	12,728
Wool (sheep) (lbs.)	132,207,029	3,899,828	161,974,684	4,780,594
Manures (lbs.)	1,606,878	6,652	6,176,589	20,819



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	Price. s. d.		
Education Commission Report of, 1911 (Dutch) ...	4 0	Mines, Works and Machinery Act with Regulations, 1911
Education Commission Minutes of Evidence, Vol. 1-4, 1911 (English only) ... each	5 0	Municipalities, Acts of Parliament relating to
Explosive Act with Regulations, 1911 ...	1 0	Municipalities, Ordinance relating (No. 10-11) (English and Dutch)
Geological Survey of South Africa, Vol. I, 1894 ...	7 6	Native Locations Commission, Report on, 1901
Do. Do. Vol. II, 1899 ...	10 6	Native Territories, Statutes, Proclamations and Government Notices in force on the 30th June, 1907
<i>Gezicht Register der Oude Kaapsche Familien:</i>		Do. Do. Bound, non-interleaved ...	16
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Do. 1/2 Calf ...	14 0	Do. do. do. 1912 ...	2 0
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